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PROCEEDINGS

OF THE

Boston Society of Natural History.

VOL. VI.

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PROCEEDINGS

OF THE

BOSTON SOCIETY OF NATURAL HISTORY.

TAKEN FROM THE SOCIETY'S RECORDS.

July 2, 1856.

Prof. Jeffries Wyman in the Chair.

Dr. Wyman, on taking the chair, announced to the Society his acceptance of the office of President, to which he had been elected at the last meeting, and entered upon his duties as presiding officer.

The Committee appointed to take into consideration the expediency of making summer excursions, asked for further time to report; which was granted.

A ninth letter was read from Mr. E. Samuels, giving a list of specimens collected in California for the Society.

Two letters were read from Dr. James Lewis, of Mohawk, N. Y., dated June 18th and June 21st, presenting eighty-seven species of shells from his own neighborhood and twenty-five species from Georgia, Alabama, and Ohio, with the following list of

SHELLBEARING SPECIES OF MOLLUSCA OBSERVED IN PORTIONS OF HERKIMER AND OTSEGO COUNTIES, NEW YORK.

BY JAMES LEWIS, MOHAWK, N. Y.

1. *Unio complanatus*, Lea; rivers and canals. 2. *U. cariosus*, Say; Mohawk River; very rare. 3. *U. luteolus*, Lam.; Mohawk River; very rare. 4. *U. ochraceus*, Say; Mohawk River; very rare. 5. *U. radiatus*, Lam.; lakes; abundant.

6. *Alasmodon rugosa*, Barnes; canal and river, Mohawk. 7. *A. marginata*, Say; canal and river; rare. 8. *A. undulata*, Say; lakes; not abundant.

9. *Anodon fluviatilis*, Lea; canal; very rarely seen. 10. *A.* ——— ; new species; lakes; abundant. 11. *A. Lewisii*, Lea; canal. 12. *A. edentula*, Say; canal and mill-ponds; rare. 13. *A. Ferussaciana*, Lea; canal; rare. 14. *A. imbecilis*, Say; canal; rare. 15. *A. subcylindracea*, Lea; mill races; rare.

16. *Cyclas similis*, Say; lakes. 17. *C. modesta*, Prime; canals and streams. 18. *C. transversa*, Say; canals and river; Mohawk. 19. *C. partumeia*, Say; ditches. 20. *C. occidentalis*, Prime, (*ovalis*, Pr., formerly.) 21. *C. ovata*, Lewis; undescribed; very rare. 22. *C. crocea*, Lewis; very rare; outlets of lakes.

23. *Pisidium dubium*, Gould; river. 24. *P. abditum*, Hald. (Prime), *P. zonatum*, Pr.; ditches. 25. *P. variabile*, Pr., ditches. 26. *P. compressum*, Pr.; canal, river, lakes, &c. 27. *P. altile?* Nutt.; still waters. 28. *P. ventricosum*, Pr.; stagnant waters; rare.

29. *Paludina integra*, Say; canal and river; 30. *P. decisa*, Say; canal, river, and lakes. 31. *P. rufa*, Haldeman; canal and river; rare.

32. *Melania acuta*, Lea; canal and river. 33. *M.* ——— (2 species ?); canal.

34. *Amnicola lustrica?* Hald.; canal, river, and lakes. 35. *A. pallida?* Hald.; lakes; rare. 36. *A. limosa?* Hald.; canal and river.

37. *Valvata tricarinata*, Say; canal, river, and lakes. 38. *V. bicarinata*, Lea; lakes; rare. 39. *V. sincera*, Say; lakes.

40. *Lymnæa elodes*, Say; stagnant water. 41. *L. desidiosa*, Say; stagnant water. 42. *L. humilis*, Say; stagnant water. 43. *L. umbilicata*, Adams; stagnant water; (with 48.) 44. *L. gracilis*, Jay; lakes; rare. 45. *L. columella*, Say; lakes.

46. *Physa heterostropha*, Say; ditches, &c., &c. 47. *P. integra?* Hald.; rare; river. 48. *P. elongata*, Say; stagnant cold water.

49. *Planorbis trivolvis*, Say; stagnant water. 50. *P. bicarinatus*, Say; river. 51. *P. armigerus*, Say; stagnant water; rare. 52. *P. deflectus*, Say; lakes. 53. *P. hirsutus*, Say; lakes. 54. *P. parvus*, Say; lakes and stagnant pools. 55. *P. campanulatus*, Say; lakes.

56. *Ancylus rivularis?* lakes, on water plants. 57. *A.* ——? Mohawk River; very rare.

58. *Helix albolabris*, Say; wooded sections generally. 59. *H. alternata*, Say; wooded sections generally. 60. *H. arborea*, Say; old fallen timber, &c., &c.; 61. *H. chersina*, Say; swampy grounds, under foliage. 62. *H. concava*, Say; swampy grounds. under leaves, &c. 63. *H. electrina*, Gould; moist places. 64. *H. fallax*, Say (small var.); under rubbish in wooded sections. 65. *H. fuliginosa*, Say; very rare; habits little known. 66. *H. hydrophila*, Ingalls; moist banks of rivers, in shade. 67. *H. indentata*, Say (with 63); quite rarely found. 68. *H. intertexta*, Binney; woods. 69. *H. lineata*, Say; under logs; very rare. 70. *H. lucubrata*, Say; very rare. 71. *H. minuta*, Say; damp places. 72. *H. monodon*, Rackett; under stones and sticks. 73. *H. palliata*, Say; woods. 74. *H. Sayii*, Binney; very rare. 75. *H. striatella*, Anthony; dry and moist localities. 76. *H. thyroidus*, Say; shaded flats.

77. *Succinea obliqua*, Say; swampy flats, shaded. 78. *S.* ——? (*campestris* of DeKay); hills. 79. *S. vermetus*, Say; shady banks of river. 80. *S. avara*, Say; shores of lakes. 81. *S. ovalis*, Say; margins of ditches, &c., &c. 82. *S.* ——, similar to *ovalis*; animal entirely black; shores of lakes.

83. *Bulimus lubricus*, Brug.; moist, shady places.

84. *Pupa modesta*, Say; very rare. 85. *P. exigua*, Say; damp places. 86. *P. contracta*, Say; damp places. 87. *P. milium*, Gould; rare.

NOTES.

No. 17, *Cyclas modesta*, Prime, may be the same as *C. edentula*, Say. Mr. Prime is of a different opinion, however.

No. 30 probably embraces two species, one of which is *decisa*.

No. 33 probably embraces two species, one of which is *M. exilis*, Hald.

Nos. 34, 35, 36 are given on the authority of Prof. Haldeman, through Dr. Shurtleff, of Westfield, Mass.

No. 38 seems to be only a variety of 37. No living specimens of 38 have yet been detected. No. 39 has a more elevated spire than either 37 or 38, and was found associated with dead shells of 38 in the sediment of a small lake in the south part of Herkimer County.

No. 47 needs confirmation. I may yet secure specimens this season, so as to be able to send them.

No. 64 occasionally presents a perfectly white shell; I have found only one, however, in which the animal was alive. I have also found an occasional specimen of 48 and 79 with a white shell.

No. 48 appears to be the shell DeKay calls *P. glabra.*

No. 58, *H. albolabris*, Say. DeKay appears to have named the young of this *H. rufa.*

No. 70. I have some doubts if this be not *H. inornata*, Say.

No. 75 presents two varieties. Those growing on dry localities are of a rufous brown, and have a very clean shell. Those growing on flat lands, near the river, are coated with mud, which seems to have the effect to bleach the shell somewhat.

No. 82 may be only a variety of *ovalis.* I observe the animals are exposed fully to the direct rays of the sun, which may have an influence in modifying the color, so as to cause the animals to become wholly black, — No. 81 being usually mottled with irregular light and dark bands.

Dr. Brewer called the Society's attention to the interesting fact, that a nest of the Nashville Warbler (*Vermivora rubricapilla*) had been found in Lynn, in this State, by Mr. George Wells, an observing and enthusiastic naturalist of that town. This is a rare bird in this State, and, so far as is now known, its nest and eggs have never been met with by any ornithologist. It was included in Mr. Peabody's catalogue of the Birds of Massachusetts on the strength of a single specimen obtained by Dr. Samuel Cabot, Jr. A year or two since, Mr. Charles S. Paine, of East Randolph, Vermont, observed a pair of these birds who evidently had their nest within a certain locality.

He had no doubt that it was placed on the ground, but though carefully sought for, it was not discovered.

Though not an uncommon bird in certain sections of the country, the Nashville Warbler has escaped the observation of most of our naturalists. Mr. Audubon never obtained but three or four specimens.

Richardson and Swainson obtained only a single specimen, Wilson only three, and Mr. Nuttall mentions only one, seen near Salem. It is a rather common bird in Wisconsin, and by no means an uncommon bird in Vermont. It is quite possible that more attention to its localities may show it to be not so rare in this State as has been supposed.

The nest found by Mr. Wells contained young birds, and a single egg. The nest was placed on the ground, in a dry place, among fallen leaves, and in the shelter of a thicket of young oak trees. The egg is $\frac{19}{32}$ in length by $\frac{1}{2}$ an inch in breadth, and in its shape is very nearly spherical, with one end more pointed than the other. The ground color is white, delicately tinged with pink, and spotted over the entire surface with dark purple and purplish-brown spots; these are larger around one end, and are there gathered into a beautiful ring or wreath of confluent markings of various shades of purplish-brown. The nest was not taken, but left for the benefit of its occupants.

Dr. Brewer also stated that he was indebted to the same gentleman for the nest and eggs of the *Sylvicola pardalina*, or Canada Flycatcher. This is by no means a common bird, nor are its nest and eggs known to have been obtained before with any certainty. Mr. Audubon speaks of having seen its nest in the great pine forest of Pennsylvania; but he described it as found in a location quite different from the present instance. Mr. Wilson never met with its nest, or even with a female bird. Mr. Nuttall knew nothing of its breeding habits, and Richardson and Swainson met with no specimens of it in the fur region. Several years since, Dr. Brewer received an egg from northern Vermont, the parents of which were so well described that he had no difficulty in recognizing them as this bird, and the eggs from Lynn confirm the correctness of his supposition. The nest was found in low swampy ground, and was built at the foot of a tussock of thick grass, on the ground. It was constructed almost entirely of leaves of the white pine, so loosely arranged that it was found necessary to sew them together in order to preserve it. The eggs, five in number, in shape are an oblong ovoid, $\frac{3}{4}$ of an inch in length by $\frac{9}{16}$ in breadth; their ground color is a bluish white, irregularly marked with dots and small blotches of reddish brown.

In the same locality, the present summer, there have been found, by Mr. Wells, the nest and eggs of the Prairie Warbler, *Sylvicola discolor;* the Chestnut-sided Warbler, *S. icterocephala;* the Black-throated Green Warbler, *S. virens;* and the Black and White Creeper, *Mniotilta varia.*

Mr. Wells has also observed a pair of the Solitary Vireo, *V. solitarius*, which were evidently breeding in the vicinity. This is a rare bird, and is not given in Peabody's Birds of Massachusetts.

Prof. Agassiz stated that, for several months past, he had been engaged in an investigation into the Geographical Distribution of the Turtles in this country. For a correct determination of specific differences, it became necessary to collect specimens from all parts of the country as extensively as possible, and he had succeeded in obtaining specimens of nearly all the species existing in North America, and had been able to trace their geographical distribution very completely. Ample materials for a thorough survey had been placed in his hands through the ready assistance of his friends and correspondents, and by the officers of the Smithsonian Institution, who have put at his disposal their valuable collection. He had examined the specimens obtained by the government surveying expeditions of the several Rocky Mountain routes, and had received numerous specimens from the States in general, including Texas and California. He believed he had, at the present time, all but three species to be found in the United States proper, alive in his yard.

The results to which he had arrived establish the fact, that several species, which have been supposed identical throughout their whole geographical range, are really distinct; whilst others which have been described as different species, the young alone in some instances having served for description, have been found to be one and the same. He particularly called attention to the danger of describing species solely on theoretical grounds as different, because they inhabit different parts of the world, or as identical from general resemblances. Dumeril and Bibron, in their work on Herpetology, and others, have attempted to identify marine turtles of different waters without sufficient authority. He had himself taken particular pains to inquire about the *Sphargis* or Leather-backed Turtle, which is found from the West Indies, northward, and which has been taken at Cape Cod. This animal has been said to inhabit the Mediterranean; but the most thorough investigation shows only seven or eight instances on record of its having been found there. The museum at Salem furnishes an opportunity for distinguishing between the *imbricata* of the West Indies and that of the Indian Ocean, which have been considered the same. Holbrook describes the *Trionyx* of Georgia as existing in the Northern Lakes, and he traces the exact course by which it could ascend along the coast and up the Mississippi River to the lakes. Prof. Agassiz was satisfied that there are four different species of *Trionyx* in the United States, three of which are included in the one species of Holbrook; and that each species has its own limited locality.

The *Chelidra* or Snapping Turtles have the most extensive geographical range of any of the Chelonians. The Snapping Turtle of Massachusetts is found in South Carolina, Alabama, Louisiana, Missouri, and even at the head waters of the Osage.

Of the family of Emydæ, *E. Blandingii* is the true type. The swimming Emydæ are either Southern or Western species; there are none in New England except those which have but a limited power of swimming.

Emys Oregonensis was described by Nuttall as existing west of the Rocky Mountains. Prof. Agassiz doubts its existence west of the Rocky Mountains, because no turtles have been found in those high regions lying between that range and the Sierra Nevada. Upon the Alleghanies, turtles have been found at a height of eleven hundred feet only, and there are no indications of their existence above this height. He had received two specimens from localities east of the Rocky Mountains, one of which was brought him by Mr. James M. Barnard, from Minnesota. Mr. Nuttall's specimen, he thought, must have come from this side of the mountains.

Prof. Agassiz concluded that there is no general law regulating the distribution of the Chelonians of North America. They are distributed through four grand divisions of the country, a northeastern, a southern, a western, and a Pacific range. The facts of their geographical distribution are now well established, but the reasons are by no means evident at present. The probability is, that different individuals of the same species of animals are adapted, by peculiar organizations, to different climacteric influences, and that there is no general law of distribution for which physical agents can account.

Dr. Storer asked what was the northern geographical limit of *Cistudo Blandingii.* In 1842, he presented to the Society a specimen from Bradford, Mass., until which time it had not been observed by naturalists north of South Carolina.

Prof. Agassiz replied that he had found the eggs in Massachusetts, and raised the animal from them. There is no evidence of its existence between Massachusetts and Illinois, where it is again found. It has a circle of distribution in the Northwestern States, and another disconnected range in Massachusetts. He thinks the animal may have originated in the two different localities.

The President exhibited some Fossil Bones and Teeth, discovered by Mr. J. W. Foster, in Iowa. They consisted of remains of an animal belonging to the natural family of Suidæ, and appeared closely allied to, if not identical with the Euchærus of Dr. Leidy. A complete series of teeth was exhibited, in which the milk and permanent molars were all represented. A large portion of the skeleton, as well as the germs of the teeth of a very young animal, belonging to the same species, were exhibited, indicating that they were derived from an individual which had been born but a short time, or even from a fœtus.

Dr. Durkee exhibited a potato infested with a parasitic insect, a species of Acarus. A new generation is produced every few weeks. The gentleman who gave him the specimen informed him that the stem of the plant was likewise covered, and that he was disposed to think this might be the cause of the "potato disease." The late Dr. T. W. Harris believed the malady to be caused by parasitic fungi. Dr. C. T. Jackson was of the same opinion as Dr. Harris, and he supposed the presence of the insect in this case to be purely accidental.

Messrs. F. W. Putnam, J. L. Hunnewell, and J. M. Hayward were elected Resident Members.

July 16, 1856.

The President in the Chair.

Prof. Agassiz stated that, a few years since he had described a new family of fishes, *Embiotocoidæ*, in which the mode of reproduction is viviparous. He had now to announce the fact, that, in another family, and one well known, there is likewise viviparous reproduction. He had recently been examining the ovary of the common haddock, and had found the ova already passed the stages of segmentation. He had not yet been able to examine them during the latest periods of development, but he had no doubt that the embryos were developed within the ovary. He thought, however, that the young might be brought forth in some kind of an envelop, and thus escape observation. In the Cod, Whiting, and American Hake, the ova likewise undergo development in the ovary. Prof. Agassiz was informed by the fisherman who had supplied him with the specimens in which this discovery was made, that he had for a long time supposed that the young were formed in the parent.

Prof. Agassiz had been endeavoring to find homologies of development in all animals of the vertebrated type, and had succeeded in tracing them so far as to be able to distinguish between vertebrata and invertebrata in the earliest stages of development of the egg.

The President remarked that every new instance of ovarian impregnation was of great importance. The most recent researches go to prove that the seminal fluid comes in direct contact with the ovum, and perhaps enters into its substance; but in Anableps, the ovum is surrounded by a membrane which would tend to prevent any such entrance.

Prof. Agassiz observed that he considered fecundation as a series of acts rather than a single act. In Chelonians, the circumstances under which the eggs are developed, would lead to the inference that an impulse is first received from the male, and then that four successive copulations in four successive years, twice a year, are necessary before segmentation takes place in the egg. In the Haddock, ovarian gestation has this physiological import, that it shows that what is a normal condition in one animal of a certain type, may be abnormal, and occur only exceptionally in another animal of the same type, as in man and other of the higher forms of vertebrata.

Dr. Gould inquired how ovarian impregnation took place in fishes.

Prof. Agassiz replied that he had seen certain fishes place themselves in such a position that there was close approximation of the abdomens of each, whilst in the female the entrance to the ovary was open to a very considerable extent.

Mr. Bouvé, in behalf of the Committee appointed to consider the subject of summer excursions, reported in favor of the project, and proposed that the first excursion should be made to Hingham and the neighboring country. It was voted to assemble on board the Hingham steamboat at 9 o'clock, A. M., on Wednesday, July 23, and it was understood that the Committee would make arrangements for proper conveyances at Hingham when the company should arrive.

Dr. C. T. Jackson read an extract from a letter of Mr. Roswell Field, of Greenfield, Mass., in which he says he thinks he has discovered an entirely new footprint of a biped web-footed animal, two and a half inches long, with a stride of about ten inches, and with an impression of a tail. He regards it as much more perfect than the one described by Prof. Hitchcock, and thinks it may even prove that the latter was not made by a web-footed animal.

This letter was referred to the President.

Dr. A. A. Gould presented the following descriptions of shells: —

HELIX REPERCUSSA. T. sinistrorsa, discoidea, supra planulata, infra concava, plicato-striata et lineis volventibus supernè insculpta, castanea; anfract. utroque 6+, ultimo vix angulato, propè aperturam deflecto: apertura despiciens, obliquè lunata, peritremate reflexo, posticè callo angulato juncto; lamellis palatinis duabus intrò volventibus, quarum unâ ad angulum inconspicuâ.

Diam. 1; alt. $\frac{3}{10}$ poll. From Tavoy and Mergui. Rev. J. Benjamin.

Compared with *H. anguina*, it is less distorted, more elevated, concave beneath only, whorls more numerous and more closely coiled, obtuse at periphery, not marbled in coloring.

HELIX RAMENTOSA. T. suborbicularis, depressa, tenuis, perforata, fulva fasciâ fuscâ albo marginatâ ad peripheriam cincta, lineis incrementalibus et sulcis decussantibus pariter obliquis granulata; anfr. $5\frac{1}{2}$ convexiusculis, ultimo obtusè angulato; sutura valdè impressa: apertura obliquè oblongo-ovata; peritremate posticè acuto, sensim versus umbilicum reflexo, albo; fauce rufescente.

Axis half an inch; diameter $\frac{4}{5}$ inch. California; from the cabinet of Dr. W. Newcomb.

Agrees well with *H. zonata*, Pfr., in which the umbilicus is larger, and no allusion is made to the rasp-like surface.

HELIX DAMASCENUS. T. conico-globosa, imperforata, solidula, dilutè prunina ad apicem violacea subtus cinerascens, rudis et

lineis tenuibus interruptis numerosis cincta ; anfr. 5 rotundatis ; suturâ impressâ : apertura subcircularis ; peristomate angustè reflexo, pallido, extremitatibus approximatis ; fauce lividâ ; columellâ incrassatâ, rotundatâ.

Axis $\frac{}{10}$; diam. $\frac{7}{10}$ poll. Desert region east of California. From the collection of Dr. W. Newcomb.

The texture and coloring is much like that of *H. alauda*, Fer., but the shell is smaller and more elevated.

Bulimus lepidus. T. parva, plerumque sinistrorsa, vix perforata, ovato-conica, elevata, polita, citrina ; anfr. 6 convexis, ultimo ventricoso ; suturâ bene impressâ : apertura subcircularis ; peristomate albo, reflexo, ad columellam dilatato, extremitatibus approximatis.

Axis $\frac{7}{8}$; diam. $\frac{1}{2}$ poll. Mergui Islands. Rev. J. Benjamin.

A pretty shell, grouping with *lævus*, *Adamsii*, and *moniliferus*, but smaller, proportionally shorter and more ventricose, and differing entirely in coloring, texture, and the broadly rounded form of the aperture.

Bulimus lautus. T. subperforata, obliquè ovato-triangularis, tenuis, eburnea longitudinaliter rufo-lineata ; suturis pallidis ; anfr. 6, ultimo ad peripheriam in carinam compresso, subtus versus umbilicum declivi et plicato : apertura obliquè triangularis, ad angulum latero-basalem canaliculata ; peritremate expanso, intus incrassato, albo, rosaceo vividè submarginata.

Length, one inch ; breadth, half an inch. From the mountains of Equador, near Quito ; by Joseph P. Couthouy, Esq.

A most remarkable and beautiful shell, belonging to the peculiar group of Bulimi, with angulated apertures, found on the Andes, near Chimborazo. The basal angle stands off further from the axis in this than in any other species yet figured. *B. semiclausus* is banded, the basal angle rounded, the spire less acute. *B. Knorri* is more elongated, and the basal angle nearly axial. *B. murrinus* and *B. fabrefactus* are also allied.

Streptaxis prostrata. T. pupoidea, valdè distorta, tenuis, dilutè cornea ; anfr. 6, posticis lateraliter appositis, ad peripheriam acutè angulatis, antico subtus glabrato : apertura longior

quam latâ, laminâ palatali instructa; peristomate reflexo; umbilico crescentico, satis magno.

Long. $\frac{3}{8}$ poll.; lat. $\frac{1}{4}$ poll.

Found by Dr. G. A. Perkins, at Cape Palmas, and at Rockbookay, twenty miles in the interior, under dead leaves. He says "the animal is beautiful red, yellow, and orange." It is of the size of *S. aberrans*, but is more eccentric and more compressed.

STREPTAXIS ELISA. Testa modica, valdè secunda et compressa, supra tenuiter striata, infra glabrata et latè perforata; spira discoidea; anfr. 7 + juxta suturam profundam angulatis, ultimo lateraliter valdè protenso: apertura transversa, subquadrata, peritremate everso, intus denticulis quatuor cruciatim dispositis armato, quinto minimo interdum posticè addito.

Length, half an inch; height, $\frac{1}{4}$ inch. From an island in the Mergui Archipelago; Rev. J. Benjamin.

In size and form most like *S. Souleyetana*, but is even larger and more depressed; aperture much as in *S. pyriformis*, but more elongated, and the posterior denticle is very small and marginal; the shell is double in size.

STREPTAXIS EXACUTUS. T. grandis, omnino dislocata, latè umbilicata, pallidè cornea, supra acutè lirata, infra polita: spira discoidea, lateralis; anfr. 6 + penultimo posticè valdè protruso, exacuto, apicalibus convexiusculis, benè discretis: apertura subquadrata; peristomate albo, reflexo, posticè angustato et sinuato; palato laminâ subcentrali et alterâ inconspicuâ ad angulum munito.

Length, $\frac{1}{2}$; breadth, $\frac{3}{10}$ poll. Found by Rev. F. Mason, in Burmah.

More solid and compressed than *S. elisa*, with no denticles on the peritreme, and with the edge of the penult whorl forming the posterior end of the shell very sharp.

CLAUSILIA VESPA. T. solida, sinistrorsa, vespæformis, deflecta, lævis, intensè rufa; anfr. 6, anteriori raptim attenuato, proximo corpulento, apicalibus citò decrescentibus; sutura impressa, vix marginata: apertura ovata; columella biplicata; peritremate latè reflexo, rufo.

Long. 1; lat. $\frac{3}{10}$ poll. Inhabits Tavoy. Rev. Francis Mason. This very singular, wasp-like shell is allied to *C. insignis*, *Philippii*, *Cochinchinensis*, &c., but distinguished from all by its peculiar form.

! Cyclostoma pollex. T. polliciformis, distorta, subumbilicata, rufescens; anfr. 6, ultimo ventraliter planulato, dorsaliter gibboso; anfract. posticis nonconformibus, rotundatis, dextrorsum nutantibus; sutura profunda, marginata: apertura circularis, posticè truncata; peritremate duplici, modicè reflexo.

Long $1\frac{1}{4}$; lat. $\frac{5}{8}$ poll. Tavoy, British Burmah. Rev. Francis Mason.

This singular shell may possibly be *Cyclostoma chrysalis*, Pfr., but is larger, destitute of lines and indentations. That shell is said to come from Arva, (probably Ava.) *Megalomastoma Myersii*, Haines, is another species of the same type, but less distorted and more cylindrical.

These shells, coming from the same region, to which many others will doubtless hereafter be added, I regard as constituting a natural group, probably generic, for which I would propose the name Pollicaria. Shell subperforate, chrysalidiform, ventrally flattened, spire secund; aperture subcircular, truncate posteriorly within the peritreme.

Cyclostoma cucullata. T. umbilicata, depresso-conica, solidula, lineis incrementi et lineis volventibus tenuibus supernè insculpta, straminea ferrugineo tessellatim marmorata, et infra lineata, apice nigro; anfr. 5 rotundatis; suturâ profundâ: apertura (genuina) elliptica; peritremate reflexo, et cucullo lato unicolori obliquè truncato valdè protracto; fauce flavâ.

Diameter, exclusive of false lip, $\frac{9}{10}$ inch; projection of hood-lip $\frac{1}{4}$ inch; axis $\frac{5}{8}$ inch. From an island in the Mergui Archipelago; Rev. Judson Benjamin.

With the exception of the aperture, the shell is much like small specimens of *C. linguiferum*, or still more like *C. irroratum*, Sowb. Its remarkable hood is sufficiently characteristic.

Mitra florida. T. ovato-fusiformis, solidula, albida ferrugineo nubeculata et lineis numerosis fuscis interruptis interdum albo articulatis cincta, quoad rostrum plicata et obliquè lirata; anfractibus 7+ ultimo spiram ter excedente, anticè angustato:

apertura angusta, posticè acuta; labro acuto: columella sexplicata, plicâ postremâ proximam bis superante; intus alba.

Axis $1\frac{3}{4}$; greatest diam. $\frac{3}{4}$; length of aperture, $1\frac{1}{5}$ inch. Received from Dr. Edmund Ravenel, of Charleston, as from Florida. Another specimen, in the possession of Dr. Jay, was supposed to have come from the Philippine Islands.

Its characters are intermediate between Mitra and Voluta. It most resembles in form and coloring a small *Vol. antiquata*, but the markings are much more crowded and delicate.

UNIO LEPIDUS. T. transversa, elongato-ovata, tenuis, ventricosa, valdè inequilateralis; umbonibus tumidis, leviter undulatis, dilutè viridibus; disco olivaceo, vix radiato; latere antico rotundato, supernè angulato; latere postico ovato, marginibus arcuatis; dentibus cardinalibus erectis, lamellatis, fimbriatis; dentibus lateralibus, rectis, acutis; margarita argentata, posticè iridescente; cicatricibus anticis sejunctis.

Long. $2\frac{3}{4}$; lat. 1; alt. $1\frac{1}{2}$ poll. From a creek near Lake Monroe, Florida; Dr. Henry Bryant.

Very closely allied to *U. trossulus*, Lea, but is larger, more fragile, and the cardinal teeth are more compressed.

UNIO CORUSCUS. T. parva, solida, transversè ovata, ad dorsum lata, deorsum cuneata; umbonibus anticis valdè erosis; latere antico rotundato; latere postico acuminato; margine dorsali valdè declivi; margine ventrali lentè arcuato; epidermide piceo, nitente; dentibus cardinalibus obliquis, validis; dentibus lateralibus curtis, rectis; cicatricibus anticis sejunctis; margarita vividè cupreo-purpurea.

Long. $1\frac{3}{8}$; alt. $\frac{7}{8}$; lat. $\frac{3}{5}$ poll. River St. John's, near Lake Beresford, Florida; Dr. Henry Bryant.

Of the same type as *U. Buckleyi*, and might be thought the young; but it is more solid, less angular, is much darker colored, has a much more brilliant nacre and a stronger hinge; *trossulus* is less cuneate and has a white nacre, as has also *U. Brumbyanus*.

TEREDO THORACITES. T. magna, solida, subequilateralis, alba; valvis trilobatis; areâ anteriori maxima, anticè truncatâ, obtusè lanceolata, concentricè insculptâ; areâ intermediâ uncinatâ, ad apicem obtusâ, apophysi valido intus suffultâ; areâ posteriori minimâ, lunatâ, supernè emarginatâ, incrassatâ; tuberculis cardinalibus magnis, uncinatis; apophysi subumbonali compresso, geniculato; ossicula siphonalia pulpito mediano instructa, altero latere subulato, altero ligulato.

Length and height, ½ inch; breadth ⅗ inch. Tavoy, British Burmah; Rev. F. Mason and Rev. J. Benjamin.

In size and solidity this exceeds any species yet described. It is chiefly characterized by the great size of the anterior area when compared with the posterior; the stilt-like form and great length of the pallets is also quite peculiar.

Dr. C. T. Jackson gave a brief description of the bituminous coal formation of Elk County, Pennsylvania, which he had been engaged in exploring during the month of June last. He observed that the great bituminous coal basin or trough extends from the Northwestern border of Pennsylvania to Tuscaloosa, Alabama, as indicated on Mr. Jules Marcou's Geological Map of the United States.

The northern portion of this basin is of great economical value, on account of its being the nearest to Lake Erie, one of the greatest markets for coals, which are required for steam navigation on all the great lakes, and for the furnaces and gas works, as well as for domestic use for fuel, on both the United States and Canada sides of these lakes. He remarked that statistics showed a larger amount of tonnage on the lakes than exists on the Atlantic coast of this country, and that steam navigation would certainly greatly increase upon the lakes when coals could be obtained at a reasonable cost, as will soon be the case, when the western portion of the Sunbury and Erie Railroad, now under contract, is completed, which would be done in the course of two years.

Since the recent explorations were made into the extensive coal formation of Elk County, Pa., the Directors of this important railroad have ordered the road to be laid amid those coal fields, and the consequences of this movement will soon be felt in the augmented value of the coal lands.

The particular region explored by Dr. Jackson, is known as the Ridgeway Land and Coal Company's property, some 27,000 acres of land, all situated in the coal region. Five or six beds of coal underlie this soil, and they generally dip only from two to five degrees from the horizon, and are from two to six feet in thickness. Most of the large beds are undisturbed, and only the small upper ones are here and there denuded by valleys of excavation. The deep ravines, or runs, expose some of the outcrops of the larger beds on the southeast sides of the hills; on the northwest they are still deeply covered with rocks, the sandstones, and bituminous shales.

Each of these coal beds is overlaid with a stratum of eight or ten inches of slaty cannel coal, and they all rest on fire-clays. Iron ores, namely, carbonate of iron and brown hæmatite, abound; the former in the fire-clays, and the latter in the superincumbent shales. But few fossil plants are found in these shales, and only the scales, fins, and tails of fishes in the slaty cannel coal, which appears to have been a fine aqueous sediment of water-logged vegetable matter.

A bed of buff-colored limestone occurs beneath the principal bed of coal, and is nine or ten feet thick. This limestone contains small fossil bivalve shells not yet named.

The Ridgeway lands, then, contain coal, iron ores, limestone, and sandstone, with an abundance of clay suitable for fire-proof bricks. All the facilities for the reduction of iron exist on the spot, and soon the means of transportation of the coals and metal to market will be supplied. The county is elevated about 1,600 feet above the sea, and is in Lat. 41° 25′ N. and Lon. 1° 40′ W. of Washington, and is remarkably healthful.

The following analyses of the coals, iron ore, and limestone have been made by Dr. Jackson since his return to Boston. Specimen from the six feet bed: —

Fixed carbon	52.38
Gas expelled by heat	40.00
Ashes of coke	7.62
	100.00

The ashes analyzed yielded —

Silica	6.20
Alumina and oxide of iron	1.10
Lime	0.22
	7.52

The slaty cannel gives —

Fixed carbon	32
Gas	24
Earthy matter	44
	100

The limestone yielded —

Carbonate of lime	95.75
Insoluble silica	3.00
Peroxide of iron	1.25
	100.00

Analysis of the balls of carbonate of iron: 100 grains of this ore yielded —

Peroxide of iron	61.50	= iron 43.
Carbonic acid	31.50	
Silex	7.00	
	100.00	

In smelting iron ores with these coals, it will be necessary to convert the coal into coke, and the small coals may thus be disposed of on the spot.

No better gas-making coals are found in the United States, and but one better variety in the British Province of New Brunswick — namely, that of Albert County.

Dr. Jackson spoke in high terms of admiration of a series of fossil fishes now at the Smithsonian Institution undergoing description by Dr. Newberry. He stated that these fossils appear like fishes cast in brass, the scales of the ganoids being covered with a film of iron pyrites; and expressed the hope that Dr. Newberry might soon exhibit some of them to the Society. They were found in the Diamond County coal mine in Ohio.

Dr. A. A. Gould exhibited a specimen of the common *Lumbricus ascaris*, an intestinal worm, which was vomited alive by a person, by whom, and by whose friends, the worm was called a *snake*. Dr. Gould referred to two or three other and similar cases, and observed that science could do much to disabuse the public of the incorrect idea that animals could live for any considerable length of time in the human body, unless they belonged to some of the parasitic forms.

Some discussion ensued as to the possibility, under any circumstances, of a foreign animal living in the human stomach. The President narrated a case of a living toad, which was swallowed by an insane man, having been vomited, soon after, dead; and the results of some experiments, in which worms were taken into the stomach in perforated tubes, where the worms lived but a short time.

Dr. C. T. Jackson presented, in the name of Mr. Addison Gott, of Rockport, some Parasitic Crustaceans, commonly known as Salve Bugs.

Prof. Agassiz remarked that these animals contain an apparently oily matter, which, after immersion in alcohol, is changed into a substance resembling wax, and which is so hard as not readily to be cut with a knife.

The specimens were referred to Dr. Jackson for chemical examination.

Mr. Robert Kennicott, of West Northfield, Cook Co., Ill., was elected a Corresponding Member, and the following named gentlemen Resident Members, viz: James E. Mills, Thomas W. Clarke, John Green, Edwin A. Gibbens, J. Henry Safford, Joseph Worcester, John Dean, David F. Weinland, Augustus J. Perkins, Samuel Hammond.

July 23, 1856.

EXCURSION MEETING.

In pursuance of a plan adopted at the last meeting, the Natural History Society met on board the steamer Mayflower, for an excursion to Hingham and the neighborhood. There were present about thirty of its active members, several of them being among its founders or the earliest enrolled upon its list. After a beautiful sail down the harbor and among the islands, the company found ample arrangements made for them at Hingham by the committee, and were conveyed in carriages along the new road in the direction of Nantasket Beach. This road, opened two years since, presents a number of interesting features to the student of nature.

Mr. Thomas T. Bouvé, the Chairman of the Committee of Arrangements, and to whom the Society were indebted for the complete success of the occasion, was most earnest in his endeavors to call attention to every object of interest and instruction upon the route. Upon passing through the woods, not far from the Old Colony House, he pointed out several nests of the Night Heron, (*Ardea nycticorax*,) built of sticks, high up in the trees. He remarked that these were the only Night Herons to be found anywhere in the vicinity of Boston, with the exception of those at Fresh Pond, and that there was danger of their complete extermination, if the young were taken and destroyed by people in the neighborhood, as has been done lately. Some distance further on, were seen the remains of submerged trees, supposed to be cedars, which had been imbedded in the peat, and which were exposed in the construction of the road.

The President gave some account of these remains, consisting of large stumps and roots, buried in salt-water peat. The swamp in which the trees grew, was somewhat below tide water, and in consequence of the breaking down of the barriers, the communication with the ocean had been made ; and the whole tract, consisting of many acres, formerly covered with trees, is now regularly flowed by the high tides. This is one of several instances in which the ocean has made its inroads upon the shore in this neighborhood. The most recent breach occurred a few years since, near Pleasant Beach, during the great storm which carried away the Minot Lighthouse ; the sea barrier was broken through, and every tract of fresh water was invaded, and, unless soon reclaimed, will become permanently a part of the domain of the sea.

He also called attention to an Indian cemetery, on the southeastern slope of Atlantic Hill, near Nantasket Beach.

An examination of several of the graves had been made by Mr. Francis Boyd, by whom attention was first called to them by Mr. F. Burr, one of the proprietors of the land, and Drs. M. and J. Wyman. Portions of the remains of four adults and one child had been found. The cranium of one of the adults was sufficiently well preserved to exhibit the unequivocal anatomical characters of the North American Indians. Generally, the bones were too much decomposed to be removed, except in fragments. The original position of the bodies, as shown by that of the bones, was on one side, with the knees drawn up, and not in a sitting attitude. The articles buried with them consisted of fragments of pottery, composed of clay and pounded clam shells, of stone pestles, and a clay pipe, all of Indian manufacture; also of an iron hatchet, a brass kettle, some beads of brass, and others of glass, which must have been obtained from the white settlers. These latter articles, of course, bring down the date of the cemetery to a period subsequent to the settlement of the country.

Mr. Boyd invited the members of the Society to his house, where they had an opportunity of examining such of the remains and relics as were in his possession, and at the same time were provided with a most generous and hospitable entertainment.

After a ride a short distance upon the beach, the carriages were left, and the party wandered along the rocks and sea-shore towards Cohasset, where those interested in shells, fish, marine plants, minerals, &c., had opportunities of collecting specimens. Here remarks were made by those particularly versed in special subjects, amongst others, by Dr. David F. Weinland, who called attention to the ovaries of the Whiting, in which were eggs in process of embryonic development; a fact which Prof. Agassiz has recently noticed in this fish, the cod, the haddock, and the American hake, our most common fishes, and which have hitherto been supposed to be oviparous and not viviparous.

Meeting at a certain rendezvous, and resuming seats in the carriages, a pleasant drive was taken along the ridge road; stopping to view the famous trap dyke upon the sea-shore, and its striated markings, indicative of glazier action according to some, or of drift action according to others; the prominent features of the dyke and surrounding rocks being pointed out by Dr. C. T. Jackson, Mr. Francis Alger, and Mr. Bouvé.

At about three o'clock, the company arrived, by special invitation, at the beautiful mansion of Mr. Bouvé, where, after examining his magnificent mineralogical and geological cabinet, the Society sat down to a handsome banquet provided by him. After dinner, and a song from the accomplished Curator of Botany, a portion of the party scattered themselves for the collection of specimens, whilst the remainder assembled under the trees to listen to some remarks upon what had been seen during the morning.

Some observations were made by the President, upon the manner in which the *Limulus* (the Horseshoe Crab) casts its shell. Unlike that of the crabs and lobsters, this is cast entire. The first step towards the formation of a new shell, is the separation of the soft parts from the old integument; the new covering, at first quite soft, is everywhere minutely convoluted, in order to accommodate its increased surface. The old shell splits around the convex border of the head and thorax, and the *Limulus* escapes, withdrawing its legs, gills, and tail. The animal immediately expands, the convolutions of the new shell are drawn out, it hardens, and the growth is finished until the period of the next moulting. Dr. Wyman had found the horseshoe in the stage preliminary to shedding the skin, and in the act of leaving it; in the latter case, the animal was not yet freed from the old shell, but its growth was already complete. From observations made on many shells, he had ascertained that at each moulting the increment was by one third to one half of the dimensions of the animal. Growth takes place at no other time than during the moulting period. The cuticle which lines the œsophagus and stomach is withdrawn at the time the external shell is cast, and comes away in connection with it.

Mr. Francis Alger spoke of the great *Beryl formation* in the town of Grafton, New Hampshire, describing its crystals of gigantic dimensions which had been discovered there. One of these crystals, which he had caused to be removed and conveyed to Boston, weighed nearly 2¼ tons, and was five feet in length. Another, the largest single crystal in the world, as far as is known, is nine feet in length, being a six-sided prism, the several faces of which measure respectively in width through the greatest diameter of the crystal, 2 feet 8 inches, 2 feet, 1 foot 11 inches, 1 foot 10 inches, 1 foot 6 inches, and 1 foot 9 inches — thus giving it a circumference of 12 feet. This crystal yet remains at the locality, but the quartz and feldspar surrounding it have been carefully removed by chisels, so that its position in its native bed can be readily observed. Three weeks labor of two men was expended in this process, as ordinary blasting by gunpowder would have destroyed the crystal. Its weight is probably not less than five tons.

Dr. C. T. Jackson, at the request of Mr. Alger, gave a description of the *Geology of Alger's Beryl Hill*, in Grafton, N. H., where the above-mentioned crystals are found. They occur in a very largely crystallized vein of Granite, which traverses the hill of mica slate. In extracting the crystals of beryl, large quantities of orthose or potash feldspar, suitable for making the finest porcelain ware, were obtained, and this is now exported to England for that purpose. Plates of mica, a foot or more square, are also obtained, and are useful for making windows to stove doors, &c.

Dr. Jackson next proceeded to give an account of the *Trap Dykes*, and of the rocks altered by fire which were observed by the Society upon the coast of Cohasset, stating that the rocks were originally stratified, and were of aqueous deposition, and have since their deposit become metamorphosed by the agency of trap rocks which underlie them and have burst through them, in dykes running generally nearly east and west, with occasional crossing dykes having a north and south course. The minerals produced in the metamorphosed rocks, by the influence of the trap, are amygdules of feldspar, invested with a thin layer of Epidote, and of nodules of Epidote, like those of the Nahant rocks. Boulders of quartz occur in an unaltered state, in the metamorphic rocks, in considerable abundance.

Dr. Jackson then extended his remarks to the trap rocks of different ages, and explained the remarkable influence they have exerted on limestones, slate-rocks, and sandstones, showing their agency in producing crystallized minerals and metalliferous ores of various kinds. In Nova Scotia and on Lake Superior, the trappean rocks, passing through the new red sandstone strata, combine with the ingredients of that rock, and also form an abundance of most beautiful minerals of the Zeolite family.

Native copper is also produced, in masses and in veins, both in Nova Scotia and on Lake Superior; this metal being found in large and regular veins in very gréat abundance in the Amygdaloidal trap of Keweenaw Point, Ontanagon, and Isle Royale districts, on Lake Superior.

When trap rocks act upon slate rocks, they produce iron pyrites, and occasionally silver ores, and with silurian limestones they form lead and silver ores almost exclusively; while, as before stated, native copper generally results from their influence upon the new red sandstone strata. Hence, the miner and the mineralogist are guided in their researches by a knowledge of these geological laws, which seem to be universal in their application.

Dr. D. F. Weinland gave an account of the Reproduction of Parasitic Animals, and explained the phenomena of Alternation of Generation in the parasitic Trematoda of the Freshwater Snails. The first generation of this animal exists, in the form of "Distoma," in the intestines or lungs of Vertebrata, as a perfect animal with genital organs producing eggs; the next generation exists as a yellow worm in the liver of the snails mentioned above, with or without an intestine, their bodies being filled with the third generation of the animal, viz: little worms with long tails — the so-called Cercarians — which originate in the body of the yellow worm by a kind of budding. In the third generation, these Cercarians are brought forth by the mother, swim for a while free in the water, and then become a kind of pupa; forming a cyst around themselves, and in this state seeming to wait till, by chance, they are swallowed by a vertebrated animal in which they become, in a few days, as is shown by experiment, a perfect Distoma.

Dr. Weinland had found a new species of Cercaria, the first known in this country, in the liver of the *Physa heterostropha*, and he concludes, from further investigations, that this Cercaria belongs as a larva to a blackish-spotted Distoma, which he has found frequently in the lungs of frogs and toads, and once in the intestine of a turtle, and which he proposes to describe under the name of *Distoma atriventre*.

He added that a similar alternation of generation takes place in another order of Helminthes or Parasitic worms, viz: the order of Cestoda. The investigations of Kuchenmeister and

Siebold have shown that the cysts in the flesh of the hog, causing the condition known under the name of "measly pork," are pupæ of the human tapeworm, and that they develop themselves into the latter when taken into the human intestine ; and that the human tapeworm, when eaten by a hog, produces in this animal these cysts. In three instances, in which he had seen tapeworms in Americans, these worms were identical with the *Tænia solium*, the tapeworm of the English and Germans, the same species upon which the experiments of Kuchenmeister were made,— not the *Botriocephalus latus*, the tapeworm of the French and Swiss, which seems to have a different kind of development. He had found a larva of a tapeworm, a so-called Scolen, with two large red spots behind the head, in the intestine of the common Alewife, (*Alosa Americana*,) provided with four large suckers, (*acetabula*,) but not having an articulated body, nor genital organs. This larva was destined, as he supposed, to become a perfect tapeworm only in the body of another vertebrated animal by which the alewife might be swallowed, — perhaps in a shark. He had found another larva of a tapeworm, the *Tetrarhynchus Morrhuæ*, Rud., (*T. corollatus*, Siebold,) in a cyst near the heart of the common codfish. He had found the larva of tapeworms, known under the name of Cysticercus, in the pelvic region of the American hare, (*Lepus Americanus*,) and in the liver of the rat, (*Mus decumanus*.) After a careful comparison, he found them identical, one with the Cysticercus of the European hare, and the other with that of the European rat; which become, according to the experiments of the same Helminthologist, Kuchenmeister, the first, the tapeworm of the dog, and the second that of the cat; a fact likewise noticed by the American hunters.

Dr. Weinland supposed that this Cysticercus of the American hare came from the European dog ; the eggs of the tapeworm having been swallowed by the hare, perhaps with vegetable food. In another and new species of tapeworm, the *Tænia punctata*, Weinl., found in the gold-winged woodpecker, he had observed the embryo just hatching. The shell of the egg of this worm has two processes, each terminating in a large ball ; the embryo is provided with six spines. Some years ago, Dr. Hein and Dr. Meissner found pupæ of tapeworms in cysts in a land-snail, (*Helix pomatia*,) and in a beetle, (*Tenebrio molitor*,) and in the cyst were found six little spines thrown off by the embryo. Thus, we have reason to believe that that hatching embryo, with its six spines, penetrates into an insect or a mollusk, forms there a pupa, loses its spines, and waits in this state till the snail or the insect is swallowed by a vertebrate; for in vertebrata only we find perfect tapeworms. In the case of *Tænia punctata*, we may suppose that the embryo enters an insect, forms there a pupa, which afterwards is eaten with the insect by the woodpecker, and then is developed into a tapeworm. Thus, the intimate relations existing between the woodpecker, its tapeworm, and the insects in which the latter lives as a pupa, and upon which the woodpecker feeds, must be intimately concerned in the preservation of the species of this worm; and if we consider how infinitely small is the chance of a single egg's perfecting its development in that bird, we see why one tapeworm should furnish millions of eggs in a year.

The Psorospermia, discovered first by Johannes Müller, which may be another larval state of a worm, Dr. Weinland had found by thousands attached to the hind part of the eye bulb of the American Haddock, (*Gadus aeglefinus*.)

To a question proposed by Dr. Gould, "Whence come the parasitic worms of the Fœtus in Utero?" Dr. Weinland answered, that only two or three such instances are known; and from the fact that he once witnessed an Ascaris penetrating a membrane in such a manner, that, after it had traversed it, there was not to be seen any perforation in the membrane, (the worm having separated the fibres of the tissue without tearing it,) he thought that he could explain the presence of the worms, found in the embryo, by a passage from the abdomen of the mother and through the walls of the womb, and thence into the body of the embryo; a movement which, according to this observation in Ascaris, could be effected without wounding the tissues.

Mr. Charles J. Sprague exhibited a beautiful specimen of a *parasitic fungus* growing upon the body of a beetle, a species of Sphæria. He said he supposed that the insect more or less completely buries itself in the earth, and then the plant attaches itself to its surface, and sooner or later destroys it. Mr. Sprague had been making a special study of these peculiar and little known growths the past year.

Mr. Bouvé made a few remarks upon the origin of *Igneous Rocks,* comparing specimens of the igneous rocks of New Hampshire and lava from Vesuvius, to illustrate the resemblances and differences between quick and slow crystallization.

After these interesting and instructive observations, followed by the interchange of much general information in a more private manner, and after passing votes of thanks to Mr. Bouvé for his untiring exertions throughout the day, and to Col. Boyd for his most welcome hospitality, the Society took the cars for Boston, and returned well satisfied that a day could not have been more agreeably and more instructively passed ; and the hope was universally expressed that this excursion might be the first of a series, which would inevitably tend to augment the usefulness and prosperity of the Society.

August 6, 1856.

The President in the Chair.

Prof. William B. Rogers exhibited to the Society several specimens of rock, containing casts of portions of a large Trilobite lately obtained by him from a locality on the north edge of Braintree, about ten miles south of Boston.

Prof. Rogers adverted to the great interest of this discovery as furnishing the first clear evidence yet obtained as to the geological age of any of the extensive series of altered rocks which occupy a large part of eastern Massachusetts and the neighboring States.

Hitherto, geologists have not been aware of the existence of any fossil forms in these strata, as none are referred to in the Geological Report of Prof. Hitchcock, or in any of the subsequent publications relating to the rocks of this region. The present discovery, therefore, will be a matter of surprise as well as gratification to those who have given attention to this obscure, and hitherto unproductive, portion of our geology.

It is true, that in view of the lithological characters of these altered rocks, and their relation in strike and position to the carboniferous strata adjoining them towards the southwest, in the contiguous parts of Massachusetts and Rhode Island, they have of late been considered as probably belonging to parts of the Paleozoic series, inferior to the coal measures, and including portions of the Devonian and Silurian systems. But the want of any positive evidence derived from fossils has, until now, left us without a clue to the actual Paleozoic age of any part of the group, and has indeed given a character almost purely conjectural to speculations in regard to the epoch of the group at large.

In respect to the zoölogical relations of the Braintree Trilobite, Prof. Rogers remarked, that from the imperfect examination he had as yet given these fragmentary specimens, he was disposed to consider it as closely allied to the forms of Paradoxides, described by Green, in his monograph of North American Trilobites. Of the two species described by Green, viz: *P. Harlani* and *P. Boltoni*, only the latter has been recognized by Prof. Hall among our Appalachian fossils. This, under the generic head of Platynotus, and more recently of Lichas, he describes as a characteristic form of the Niagara group. Leaving the precise affinities of our fossil for future examination, there can be no hesitation, from its general facies, in referring it and the including strata to a date among the more ancient of the Paleozoic formations.

The rock in which these fossils occur is a rather fine-grained, bluish-gray, siliceous slate or slaty sandstone, forming part of a narrow belt of siliceous and argillaceous slates and grits ranging along the northern edge of Braintree. The fossiliferous layers are exposed in a quarry, which has been wrought for several years past to obtain ballasting material for some of the wharves in Boston, within which no doubt many of these fossils might be found among the piles of stone. The fossil casts occur not only on the parting surfaces of the strata, which are covered by a somewhat argillaceous and ochreous coating, but also in the interior of the mass, whence, however, they are less readily separated for examination.

It appears that the proprietor of the quarry, Mr. E. Hayward, and his family, have for some time been familiar with the occurrence of these so-called images in the rock, without a suspicion of their having any scientific value. But it is to the kindness of Peter Wainwright, Esq., a member of this Society, who resides in the neighborhood, that Prof. Rogers has been indebted for the first suggestion which led to the investigation of this unique and most interesting locality.

The range or strike of the fossiliferous belt is about N. 70 E., and the dip in the quarry N. 20 W., at an angle of about 45 degrees. Adjoining it on the northwest side, are exposures of a more argillaceous and indurated slate, greatly broken up by joints and irregular cleavage planes, and at a short distance further on in the same direction, these altered sediments give place to the granitoid and sienitic masses so extensively quarried in the town of Quincy. In crossing the strata towards the south, we meet with slaty and gritty rocks, becoming more and more indurated as we proceed, which, passing into beds of a semi-crystalline character, are quickly followed by another range of Sienite. Thus the fossiliferous belt is actually included, in this part of its range at least, between large masses of igneous rock; and it is not a little surprising that, under conditions so favorable to metamorphic action, the fossil impressions should have been so well preserved.

This discovery of well-marked fossils among the rocks of eastern Massachusetts, where hitherto their existence could scarcely have been suspected, may well lead us to hope that careful research in other parts of this region of altered sediments will bring to light fossil organisms not less interesting in their scientific bearings than the Braintree Trilobite.

Dr. C. T. Jackson observed that Mr. Francis Alger had a fossil, apparently identical with these and imbedded in a similar rock, which was obtained at the sale of the old Columbian Museum, in this city. Its origin was unknown.

Dr. Hayes remarked, that it was with the deepest interest that he had listened to the announcement of the discovery made by

Prof. Rogers. The new and important facts, now made known by that gentleman, throw a clear light on what was obscure, and enable us to generalize many isolated observations made in this vicinity, which without them had no scientific basis; and it must be the wish of all, that Prof. Rogers would give his attention further to this subject.

Incidentally connected with the discovery of Prof. Rogers, are some observations he had himself made, while pursuing a research on the origin of the saline matter found in the waters which traverse the rocks and drift of this part of the State. These rocks, in the simplest form of expression, are broken down granite, the resulting sand being recemented to form aggregates, to which we mineralogically apply different names. It is to the material of this cement that he would call attention, as numerous experiments have shown that it is the source from which the waters take their saline matters, when percolating these rocks.

Not only are the chlorides of the metals forming alkalies when oxidized present often, but we find salts of lime, which did not probably preëxist in the sand or original rock.

The sulphate, phosphate, carbonate, and crenate of lime are thus found, and when the aggregate reposes on other rocks, these salts are imparted to them in considerable amount.

Thus, the Argillite of Charlestown is an example of quite a collection of lime salts, associated with the proto-persilicate of iron. In other parts of New England, when the argillite passes into roofing slate, and again where the metamorphic changes have occurred, we find either these salts, or the minerals into which they have passed. Now these lime salts are foreign matters of interest, for they most commonly claim an organic origin, and associated as they generally are with iron salts, which have retained some portion of protoxide, in consequence of the presence of organic matter or carbon itself, they afford indicative evidence of the presence of organic matter, earlier in geological age than the organized forms which abound in other rocks.

Dr. Charles T. Jackson read the following paper on the coal formation of Deep River, North Carolina: —

During the month of May last, I had an opportunity of reexamining the coal fields on Deep River, North Carolina, and of tracing the out crop of the coal bed some miles further to the southwestward and across Deep River from Murchinson's to Forshee and Street's Plantations.

I had also the satisfaction of descending into the shaft sunk in the plain of Egypt, where two years since I directed borings to be made, by which the occurrence of coal beneath that plantation was discovered, and its extent under the table lands demonstrated.

This shaft, sunk under the immediate direction of Mr. Wm. McLean, is admirably constructed, is 8 feet by 15 square, and penetrates to the depth of 462 feet, where it traverses the coals.

At the bottom of this shaft I measured the following section:

Coal	4 feet
Black band iron ore	16 inches
Coal	22 "
Fire clay	6 "
Coal	7 "

Fire clay and shale at bottom.

The strata and coal beds dip from 16 to 20° S. 10° W. The aggregate thickness of the coal that can be taken out together in the chambers, is 5 feet 11 inches in thickness. These coals are quite free from sulphur, and are highly esteemed by the superintendent of the Brooklyn, N. Y., Gas Works, as good gas-making coals.

They are also particularly valuable in the forges, since they make a perfectly hollow fire by coking readily. They also will serve for steam-engine and other fuel.

On chemical examination, this coal was found to yield per cent —

Fixed carbon	63.6
Illuminating gas	34.8
Red-brown ashes	1.6
	100.0

When converted into coke, it was found to produce $65\frac{2}{10}$ per cent. of good solid coke.

The black band iron ore is too sulphurous to admit of its being converted into good iron, it retaining 0.89 per cent. of sulphur even after thorough roasting.

It yielded on analysis, per cent. —

Coal	31.30
Peroxide of iron	47.50
Carbonic acid and moisture	8.81
Sulphur	3.39
Siliceous matter	9.00

The oxide of iron was originally a protoxide iron ore, but was separated as a peroxide.

At one time, the geological age of the Deep River coal formation was a subject of dispute among geologists; some maintaining that it belonged to the New Red, and others to the Oölitic or Lias group.

Through the researches of Prof. Emmons, State Geologist to North Carolina, this question is likely to be finally settled; and it appears from his geological map, a copy of which he kindly gave me, and from his fossils which I have inspected, that the lower portion of this formation is Triassic or of the New Red Sandstone group, and the Upper Liassic.

Among the fossils discovered in the Deep River coal-bearing rocks, are numerous teeth and bones of saurian reptiles, coprolites of saurians and of fishes, and an abundance of scales of ganoid fishes resembling Catopterus of Redfield. Several species of Zamias, both the trunks and leaves, are also found. These will all be described in Prof. Emmons's Report, and will be represented by wood-cuts. I understand that this Annual Report is now in press at Raleigh, N. C.

CHEMICAL ANALYSIS OF A VARIETY OF AGALMATOLITE.

BY C. T. JACKSON.

A remarkable rock, supposed until now to be soapstone or talcose rock, was discovered a few years since on the borders of the Deep River coal-field, and was quarried as soapstone, but found unsuitable for lining stoves and furnaces, on account of its ready exfoliation when heated.

Lately, other uses have been found for this beautiful material, for when ground it is a delicate white satin-like substance, and is similar to China clay. It is ground and bolted, and sold in New York at $40 per ton. I suppose it is employed to mix with white lead, and it is said to be used also for the adulteration of fancy soaps, and also for glazing or satining wall-paper.

By chemical analysis, I find this rock is composed of, in 100 grains —

Silica	75.00
Alumina	18.75
Potash	2.00
Water	3.50
Traces only of oxide of iron	——
	99.25

It is therefore Agalmatolite.

Remarks upon the Deep River Coal Formation were also made by Prof. W. B. Rogers.

Dr. Hayes asked what chemical evidence Dr. Jackson had that the North Carolina or Deep River coal is a gas coal.

Dr. Jackson replied, that his experiments were made in the usual manner, in covered platinum crucibles, (which represent very perfectly the gas retorts,) and that he found the North Carolina coal to produce $34\frac{8}{10}$ per cent. of coal gas, which burned with a brilliant yellow and highly illuminating flame, without smoke, and did not give any sulphurous acid, or other disagreeable products, while the coke resulting from torrefaction of the coal was found to be of superior quality, giving less than two per cent. of ashes when burned. Practical trials, made with this coal at the Brooklyn, N. Y., Gas Works, had fully proved its excellence as a gas coal.

To this Dr. Hayes added, that an experiment thus made hardly demonstrated, in his opinion, that the coal was a gas coal. The amount of volatile matter given off from any coal, varies with the rapidity or slowness of heating it, and may be made up of vapor of water formed from the constituents of the coal, and heavy vapors producing coal tar, together burning with a bright flame, from a coal wholly unfit for making gas. The coals of our Western States, and those of Scotland, offer fine illustrations of the error which might be committed in an experiment of this kind; some affording a large volume of rich gas under a small percentage of volatile matter, and others with a large amount of volatile matter burning brilliantly, but producing very little gas. The distinction between gas coal and bituminous coal, can be learned by more complete processes only, and his own experience on this coal, soon after it attracted public notice, and with strong hopes that it would prove a gas coal, did not lead to such a conclusion.

Dr. D. F. Weinland called the attention of the Society to a question now discussed in the European journals of Ornithology, viz: The cause of the change of color in the feathers of birds, and in the hairs of Mammalia, and the manner in which this change is effected.

It is a well known fact that many birds, particularly the males, have a very differently colored plumage in different seasons; for instance, that the male of many singing birds has a far more beautiful plumage in the reproductive season than during the rest of the year; furthermore, that many northern birds and mammalia become pure white in winter, while they are yellow, red, brown, gray, or of a still darker color in summer.

Till within the last few years, this change of color was supposed to be effected simply by the production of a new feather or hair; but there are on record several instances which are entirely at variance with this supposition; and Dr. Weinland was of the opinion, that, although this change is generally produced by molting, many instances are proved, by past and recent observations, in which it has taken place without loss of the feather.

Human Pathology has shown many cases, in which the hair of men, from sudden terror or from grief, has turned gray or white in so short a time (sometimes in one night) that there was no possibility of a change of the hair itself. A case is known in Ornithology, in which a starling in one day became white all over, after being rescued from the claws of a cat.

These facts, however, seemed to be exceptions only, till quite recently some distinguished Ornithologists — Schlegel in Leyden, and Martin in Berlin — at the same time affirmed *that many birds get their wedding plumage without molting.*

Experiments were made by many Ornithologists; some affirmed the new statement, others denied it. But the most striking observation which had come to the knowledge of Dr. Weinland, was made by a friend of his, Mr. Junghaus, of Berlin, on a Blue-throated Warbler, (*Sylvia suecica,*) which he had in a cage. From June, 1854, till the middle of February, 1855, the throat of this bird, from the bill down to the breast, was pure white; over the breast ran three bands, blue, black, and yellow, the black one being the narrowest. In the middle of February, the blue band became darker, and spots of the same color appeared all over the white throat, with the exception of a small spot in the centre. On the 21st of February, all the throat was blue except that spot, which remained pure white till the 23d, when it became reddish. On and after the 24th, this reddish color also changed to blue; but on the 1st of March there appeared again, in the midst of this blue, a lighter spot of beautiful silvery appearance; and it is worth remarking, that this new color began at the basis of the feather, and proceeded outwards. Meanwhile, the black band on the breast had become larger, and shaded insensibly into the blue, while the yellow band remained unchanged through all these mutations. Thus the bird had got its wedding-plumage, *without losing one feather*, and this it kept through all the reproductive season. At the same time, Dr. Gloger, of Berlin, showed that a very similar observation had been previously made in this country by Audubon, on a male gull, which changed the color of its head, in a fortnight, from gray to the purest black, and, as he supposed, without changing a feather.

There can be no longer any doubt about the fact; but the question is, how can a feather change its color, when its blood-vessels and nerves are dried and dead, as is the case with every feather soon after it has reached its full growth. Dr. Weinland had only heard of one explanation, viz: that the wearing away of the fine laminæ of the veins of the feather, the so-called pinnulæ, might produce the change of color. This seemed to him not only an unphysiological view of the subject, that a bird should get its wedding-plumage by such a kind of decay of the feather, but, in the cases which he had observed, the changed feathers showed no traces of such a wearing process. The following explanation of the fact seemed to him the most natural:

Conservators of museums very frequently notice that certain birds in the collections bleach, particularly when exposed to light. A red-breasted Merganser (*Mergus merganser*) which Dr. Weinland saw, when just shot, with a red breast, and which, after having been deposited in the museum for some time, presented a pale whitish breast, showed this very remarkably. He afterward obtained a bird of the same kind, and, when fresh, examined its breast-feathers with a high power of the microscope, and found all the pinnulæ filled in spots with *lacunes* of a reddish fluid, which, from the dark appearance of their margins, seemed to be of an oily character. Some weeks afterwards the same feathers, having been exposed to the light, had become nearly white, and he found in the pinnulæ, instead of the reddish *lacunes*, only air-bubbles, which it is known produce a white color, as in the case of the lily, which is rendered white by the air in its cells. This observation led him to the conclusion, that in this case the evaporation of the reddish fluid, and the filling of the spaces with air, produce the change of color. If this fluid is an oily matter, as there is reason to suppose, it will be readily admitted, physiologically, that it may be furnished by the organism, by imbibition through the tissues, in consequence of a certain disposition of the nerves leading to the skin and to the sac of the feather in the skin, (even if the vessels and the nerve in the feather itself should be dried,) for fat goes through all tissues without resistance, and also through horn. Thus the fat coloring matter may flow out into the feathers during the time of reproduction, which is the richest season in every living organism; and then again, from want of food, cold temperature, weakness, decrepitude, or from strong emotions of the central nervous system, from sudden terror or grief,— the same coloring fat may be called back to furnish the suffering organism.

This process, effected by different physiological conditions of the organism, seems to be a reasonable explanation of the fact, that many northern mammalia and birds become white in winter, while they are dark-colored in summer; that the hair of men or mammalia, or the feathers of birds, may become suddenly gray or white from sudden terror, hard labor, or debility, while they are dark colored in mature life or in the more vigorous seasons of the organism. And if we add the hypothesis, that in the oily fluid there may take place still other chemical processes, effected by different conditions of the nervous system, such as oxidation or deoxidation, we may explain in this way still other changes of color; for instance, from yellow, through red, to black; which, from observations made during the last winter, seems to be really the case in certain turtles (*Emys picta* and *marginata*).

Mr. Charles J. Sprague exhibited specimens of the *Phallus duplicatus*, Lin., in its immature as well as mature condition, and read an account of its structure and mode of growth. In conclusion, he remarked that this fungus is not common, though it is found from time to time after rains in shady places. Its odor is intolerably strong and disagreeable; but the strangeness as well as beauty of its structure will repay an examination, which may particularly offend the sense of smell. It is common in Europe, and has been described and figured by most of the writers upon Mycology.

Prof. Agassiz remarked that he was not aware that this fungus is rare in this country. He had observed it in his garden at Cambridge. He thought the American had a different shade of green from the European, though this had not been noticed by Mr. Sprague. He had a large specimen preserved in alcohol, which he should like to compare with the European plant.

Prof. Agassiz stated that Dr. Augustus Müller had recently published a paper on the Embryology of Petromyzon, (the Lamprey,) presenting facts hardly to be credited if they had not emanated from such authority. In the family of Cyclostome Fishes, there have been placed two characteristic genera, viz: Petromyzon and Ammocetes. From the egg of Petromyzon, Müller says he has raised Ammocetes, and he has likewise seen the latter become a Petromyzon. It is now well established, that fishes undergo a form of metamorphosis as well as insects. Prof. Agassiz had himself, within a few weeks, had an opportunity of studying the embryology of a species of shark (*Acantheus Ameri-*

canus). He had found the yolk, not surrounded by an amnios, but resting in the centre of an area vasculosa, and presenting, in its early development, other peculiarities only known to exist in the egg-laying vertebrata. He considered Plagiostomes a distinct class of animals from fishes, and he thought it probable that Cyclostomes should also be separated as a class. He could not refer to one class animals developed in such different modes. The number of classes into which the animal kingdom is divided — into six by Linnæus, into sixteen by Cuvier, and into twenty-nine by Ehrenberg — shows that anatomical differences are insufficient for a proper determination of classes. He proposed that the general plan of structure be a test for types, and the manner in which this plan is developed the test for classes.

Prof. Agassiz, in alluding to the probability of a fecundation of the egg whilst in the ovary, a question discussed at the last meeting, stated that Dr. Weinland had found, in the viviparous *Zoarces anguillaris*, that the ovarian bag (Graafian Vesicle) of the mature eggs was not a simple sac, but a double one; and further, that this double sac was not continuous over the complete circumference of the egg, but that a disc of considerable size remained uncovered at the upper part, where the spermatozoa might come in contact with the yolk membrane. Dr. Weinland had also found the same condition in the skates and turtles. Prof. Agassiz thought that the same organization would be found in all Vertebrata.

Mr. Charles Stodder informed the Society that Mr. Samuels, the Society's Collector, had returned from California.

Mr. Samuels reports that he arrived at Petaluma, California, December 1, 1855, and left, in consequence of ill health, on the 4th of July, 1856. He explored the country, and collected specimens, in the distance of twenty miles east, north, and west of Petaluma, being portions of the two counties of Sonoma and Marine.

He has sent to the Smithsonian Institution eleven large boxes, containing between 900 and 1000 species, and many thousand specimens.

He has received important and valuable assistance from his brother, Mr. Uriah Samuels, who collected while he was sick or engaged in putting up and preparing the specimens, besides giving him a home for the whole time, without which it would have been impossible to have accomplished so much, with the small funds provided.

It was voted that the thanks of the Society be presented to Mr. Uriah Samuels for his kindness, and for the valuable assistance rendered the Society.

Mr. Whittemore read a letter from Mr. J. A. Conrad, of Philadelphia. Mr. C. desires to collect specimens of shells and fossils in the Western States for the Society or for individuals.

It was voted that a report of the late excursion of the Society to Hingham be entered upon the records of the Society.

The Corresponding Secretary acknowledged the reception of the following letters, viz: From Robert Kennicott and James C. Parkinson, returning thanks for election as Corresponding Members, and offering to transmit communications; from the Madison, Wisconsin, Historical Society, requesting an interchange of publications; from Edward Charlesworth, requesting an exchange of the Journal for the publications of the Yorkshire Philosophical Society; two communications from the Royal Academy of Sciences at Madrid.

September 3, 1856.

The President in the Chair.

A letter was read from M. Alexis Perry, of Dijon, France.

A letter was read from Dr. Samuel Kneeland, Jr., notifying the Society of his resignation of the office of Curator of Ichthyology, and presenting a catalogue of the Comparative Anatomy Cabinet, a portion of the catalogue of the vertebrata which he had undertaken to complete.

A communication was read from the city authorities, inviting the Society to unite in the ceremonies of the inauguration of the statue of Franklin.

It was voted to accept the invitation, and a committee, consisting of Messrs. Stodder, Jackson, and Whittemore, was appointed to make the proper arrangements.

Dr. Durkee, in behalf of the committee appointed to consider the question of purchase of the Entomological Cabinet of the late Dr. Harris, reported, that the committee had examined the collection and found it in perfect preservation ; containing between four and five thousand species of American, besides a collection of foreign insects. The committee proposed that a sum of money should be raised, by subscription, for the purchase of the cabinet. Messrs. Amos Binney and James M. Barnard were added to the committee.

The Secretary read the following communication from Prof. William B. Rogers : —

So far as I have yet explored the quarry in the Quincy and Braintree belt, containing the *remarkable fossil Trilobites* to which I referred at the preceding meeting of the Society, I find that they belong chiefly, if not altogether, to one species, which, on the authority of Agassiz, as well as my own comparison with Barrande's descriptions and figures, is undoubtedly a *Paradoxides.* Of its specific affinities I will not now speak, further than to remark that the specimens agree more closely with Barrande's *P. spinosus* than with any other form.

As the genus Paradoxides is peculiar to the lowest of the paleozoic rocks in Bohemia, Sweden, and Great Britain, marking the *Primordial division* of Barrande, and the *lingular flags* of the British survey, we shall probably be called upon to place the fossiliferous belt of Quincy and Braintree on or near the horizon of our lowest paleozoic group, that is to say, somewhere about the level of the Primal rocks, the Potsdam Sandstone and the Protozoic Sandstone of Owen, containing Dikelocephalus in Wisconsin and Minnesota.

Thus for the first time we are furnished with data for fixing conclusively the paleozoic age of any portion of this tract of ancient and highly altered sediments, and what is more, for defining in regard to this region the very *base of the paleozoic column*, and that too *by the same fossil inscriptions* which mark it in various parts of the old world.

One of the most curions facts relating to the Trilobite of the Quincy and Braintree belt, is its seeming identity with the *Paradoxides Harlani*, described by Green, in his monograph of North American Trilobites. This description, which is quite imperfect, was made out from a specimen of *unknown locality* procured some twenty-five years ago, through Dr. Harlan, from the collection of our well-known mineralogist, Mr. Francis Alger. The identity is, I think, established by the comparison of a nearly complete specimen of the Braintree fossil with the cast of *P. Harlani* taken from Mr. Alger's specimen, the original never having been returned. Considering the perfect agreement in lithological character of the matrix as described by Green with that of the Quincy fossils, and the immediate recognition of this agreement in mineral features by Mr. Alger on seeing my Quincy specimens, we can hardly doubt that the original specimen of *P. Harlani* come either directly, or through the drift scattered in the vicinity, from the same fossiliferous belt.

Dr. C. T. Jackson presented to the Society a cast of a very perfect specimen of the Trilobite (*Paradoxides Tessini*, or *Harlani*,) mentioned in Prof. Rogers's paper, which was obtained by him from the slate quarry at Braintree, on the 9th of August last. He also exhibited a cast of the specimen referred to by Prof. Rogers, which, from the character of the rock, he thought was undoubtedly obtained from the same ledge, and which was purchased by Mr. Francis Alger, at the breaking up of the old Columbian Museum of Boston, some twenty-five years ago, and was originally presented to that museum by some one residing in this vicinity.

Mr. Alger's specimen is in a sharp, angular, prismatic mass of rock, having all the appearances of having been broken from the rocks in place, and certainly was not a boulder.

From the existence of this specimen, and also from the frequent discovery of fragments of Trilobites in the erratic rocks on George's Island, geologists were prepared for the discovery of them in some of the ledges of this neighborhood, but no one ever thought of looking among the pinched up and metamorphic slates between the Quincy and Braintree Sienite hills for any fossils, until they were actually disclosed by the quarrying operations of the Messrs. Haywood at Braintree; and one of our members, Peter Wainwright, Esq., recognized them as trilobites, and as subjects of great scientific interest, and called the attention of professed geologists to the locality.

About five years ago, Mr. Eliphas Haywood first observed these fossils on opening his stone quarry for the purpose of obtaining underpinning and ballast stones. Without knowing their nature, he still looked upon them as interesting curiosities, and laid aside the specimens which have lately been brought before this Society.

He showed them to Mr. Wainwright, who at once recognized them as trilobites, and brought them to Boston for the inspection of geologists, and presented two specimens to our associate, Prof. Wm. B. Rogers, to whom the Society is indebted for the first notice of these remarkable fossils, so important in the determination of our geognostic horizon. A few days after Prof. Rogers's visit to the quarry, Dr. Jackson, by invitation of Mr. Wainwright, visited it, and made a minute examination of all the geological phenomena which it presents, and obtained specimens of the trilobites through the kindness of Mr. Haywood, and by search at the quarry in company with Mr. Wainwright. Two specimens were obtained, one entire, which is 8½ inches long and 4 inches wide.

The other, of which only the head and half the body was obtained is 6 inches wide, and its hood is 7½ inches across by the base of the head ; hence the length of this specimen must have been 12½ inches at least, which is about the size of the largest specimens of the Paradoxides Tessini discovered in Sweden. The smaller individual has twenty-one articulations, but none in the tail beyond the lateral appendages, and in this respect differs from the *P. Tessini*, its nearest analogue, which has, according to Brongniart, four faintly marked depressions or folds crossing the tail transversely. They may have been obliterated in our specimen by the changes the rock has undergone.

These Trilobites of Braintree occur in a blue gray argillaceous slate, containing silicate of lime, but no carbonate, and some disseminated iron pyrites. The stratification of the rock, as indicated by its grain and cleavages, dips to the north 50°, and runs east and west. It is but slightly altered by heat in those portions where the trilobites are found, but near the Sienite rocks it is filled with nodules of Epidote, and closely resembles the altered slates of Nahant. There is a small vein of quartz, bearing iron pyrites in it, which cuts through the slate strata at right angles. There are also slickensides surfaces on some of the cleavages or joints in the quarry, indicating, as is supposed, the polishing effects of rapid earthquake movements at the period of disturbance of the strata at the time of their disruption by intruded Sienite. These are all the marks discoverable of metamorphic action of igneous rocks on their sedimentary strata, though the slate rocks are hemmed in by the Sienite rocks on both sides, and the belt of slate is quite narrow.

On a hill near the quarry, Dr. Jackson could see the tall steeple of the Baptist Church in Somerset Street, Boston, and on taking its bearings with the compass, it was found to be

N. 10° W.; and Nahant would be a little to the east of north. The Braintree rocks would then dip under those of Nahant, unless the same formation extends across the bay; in which case, the Nahant series would form its upper strata.

The existence of these Paradoxides in the argillaceous slates of Braintree, proves them to belong to the lowest of the fossiliferous Silurian rocks, and that they are the geological equivalents of the argillaceous slates of Sweden, which are in a similar manner disrupted by the intrusion of Sienite. It is certainly interesting to find the base of the silurian system resting within the limits of old Massachusetts.

The President stated that he had recently examined the electric apparatus in the tail of one of our common skates (*Raia lævis*).

The electric organs have been noticed by several anatomists, but have been fully described in *Raia batis* and other species by Robin. In the species dissected by Dr. Wyman, the organs were more largely developed, extended further up into the base of the tail, and were more uncovered by the muscles, posteriorly, than in the ones examined by Robin. Thus far, no positive proof has been adduced to show that the organs in question really constitute an electric apparatus. Structurally they resemble those of the Torpedo and Gymnotus, but have not been observed to evolve electricity, though it has been stated that if a living skate is held by the tail, an electric shock is felt.

The President also stated that he had seen the horny shell of the egg of the skate in the process of formation. He had found one in each oviduct, surrounded by the glandular enlargement which is visible near its middle. That portion of the duct was very much thickened, and mainly consisted of long tubular follicles, opening into its cavity. Although the shells were partially formed, the yolks had not yet descended into the duct; many of them were nearly mature. If this be a normal state of things, then we have, thus far, an unobserved example of the shell being formed previous to the descent of the ovum. The shell forms a pocket, open at the upper extremity, and through this opening, which is never wholly closed, the egg probably descends into its cavity.

Dr. Durkee exhibited specimens of *Goliathus giganteus*, from the interior of Africa; a male and female Katy-did, (*Platyphyllum concavum*,) from Milton, Mass.; and two male specimens of *Spectrum femoratum*, Say, commonly known as Walking Sticks, from Brookline.

Dr. Keep presented a cast of a fourth molar tooth, occurring in the left side of the upper jaw of a human subject. The tooth was not of full size.

The President observed that there was a fourth molar in the skeleton of the Chimpanzee in the Society's Cabinet.

The following gentlemen were elected Corresponding Members, viz: Winthrop Sargent, of Natchez, Miss.; Dr. John S. Newberry, of Cleveland, Ohio; William F. Robinson, of Ceres, McKean Co., Penn.; and John R. Blake, of Greensboro', Ga.

The following gentlemen were elected Resident Members, viz: Albert Fearing, S. H. Pearce, Augustine Shurtleff, John S. Foster, and Frank D. Cobb.

DONATIONS TO THE MUSEUM.

July 2d. A collection of Shells, including eighty-seven species from Herkimer Co., N. Y., and twenty species from Georgia, Alabama, and Ohio; presented by Dr. James Lewis, of Mohawk, N. Y. (*Vide* catalogue on p. 1, Vol. VI.)

July 16th. Parasitic Crustaceans known as Salve Bugs; by Mr. Addison Gott, of Rockport, Mass. A Serpent and Salamander, from St. Mary's, Elk Co., Penn.; by Dr. C. T. Jackson. A Bat, from Cuba; by Dr. A. A. Gould. A Rattlesnake, *Crotalus durissus*, killed in Milton, Mass.; by Dr. C. C. Holmes. Two specimens of Argus Pheasant, *Argus giganteus*, male and female, from Malacca; by Oscar Gassett, Esq. *Salmo erythrogaster*, from Moosehead Lake; two specimens of *Salmo fontinalis;* a specimen of a probably undescribed species from the Great Schoodic Lakes; two Smelts; and three specimens of different species of *Alosa*, from the Penobscot River and the sea near its mouth; by Dr. S. Kneeland, Jr.

August 6th. A bottle of Fishes from the western coast of Africa; by Mrs. George S. Hillard.

Sept. 3d. A collection of specimens from California, consisting of Birds, Mammals, Corals, and Molluscs; by James Tallant, Esq., of Concord, N. H. Two young Sea-Turtles, from Penang, E. Indies; by Capt. George E. Tyler, of Dorchester. Three specimens of Prairie Massasanga, *Crotalophorus tergeminus;* three Spotted Water-Adders, *Nevodia sipedon;* Prairie Water-Adder, *Regina Grahamii; Eutamia proxima, E. radix, E. sirtalis;* Green Snake, *Coluber vernalis;* received in exchange from Robert Kennicott, Esq., of Illinois. Two specimens of *Hyla triseriata;* one of *Hemidactylum scutatum;* one of *Ameira sexlineata;* two of *Salamandra symmetrica;* two of *Salamandra* of unknown species; one of *Ambystoma punctata;* two of *Ambystoma lurida;* two of *Cestudo Blandingii;* ten of *Emys picta;* two of *Heterodon platyrrhinos;* by Dr. J. N. Borland.

BOOKS RECEIVED DURING THE QUARTER ENDING SEPT. 30, 1856.

Gliederung der Bevölkerung des Bayern. Von Hermann. 4to. Pamph. München, 1855. *From the Author.*

The Red Sandstone Formation of Pennsylvania, and Genera and Species of Shells. Isaac Lea. 8vo. Pamph. Philadelphia, 1856. *From the Author.*

American Geology. By Eben Emmons. Vol. I. 8vo. Albany, 1855. *From the Author.*

Annual Report of the Trustees of the New York State Library. 8vo. Pamph. Albany, 1856. *From the Trustees.*

Memoires de la Société Royale des Sciences de Liége. Tome X. 8vo. Liége, 1855. *From the Société Royale.*

Plantæ Kaneanæ Grænlandicœ. By E. Durand. 4to. Pamph. 1856. -*From the Author.*

Rede in der offentlichen Sitsung der Königl. Akademie der Wissenschaften. Von Thiersch. 4to. Pamph. München, 1855. *From the Author.*

History and description of the Skeleton of a New Sperm Whale in the Australian Museum. By Wm. S. Wall. 8vo. Sydney, 1851. *From the Author.*

Third supplement to Dana's Mineralogy. 8vo. Pamph. 1856. *From the Author.*

Synopsis of Entozoa and some of their Ecto-congeners. By Joseph Leidy, M. D. 8vo. Pamph. Philadelphia, 1856.

Descriptions of some Remains of Fishes from the Carboniferous and Devonian Formations of the United States. Also, Descriptions of some Remains of Extinct Mammalia. By Joseph Leidy. 4to. Pamph. Philadelphia, 1856. *From the Author.*

Memoirs of the American Academy of Arts and Sciences. Vol. V. New Series. 4to. Cambridge and Boston, 1855.

Proceedings of the American Academy of Arts and Sciences. Vol. III. pp. 185–248. 8vo. 1855–6. *From the Academy.*

Description of a New Genus of Crinoidea. By L. P. Yandell, M. D. 8vo. Pamph. 1856.

Notice of a Fossil Genus, Blastoidea, from the Devonian Strata. Kentucky. 8vo. Pamph. By B. F. Shumard, M. D., and L. P. Yandell, M. D. 1856. *From the Authors.*

Statistical Information relating to certain Branches of Industry of Massachusetts. By Francis DeWitt. 8vo. Boston, 1856.

Third Annual Report of the Secretary of the Massachusetts Board of Agriculture. 8vo. Boston, 1856. *From C. L. Flint.*

Proceedings of the American Philosophical Society. Vol. VI. No. 55. Philadelphia, 1856.

Silliman's American Journal of Science and Arts. No. 64, for July, 1856. 8vo. New Haven.

Gelehrte Antzeigen herausgegeben von Mitgliedern der K. Bayer. Akademie der Wissenschaften. Band 40, 41.

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October 1, 1856.

The President in the Chair.

Dr. S. L. Abbot was chosen Secretary, *pro tem.*

Prof. Agassiz called the attention of the Society to several living specimens of young Gar-pikes, from Lake Ontario.

They were remarkable, he said, as still preserving certain embryological characters. The most conspicuous of these was the prolongation of the vertebral column in the form of a fleshy filament, distinct from the caudal fin, which had at times a vibrating motion, involuntary, and quite distinct from the motions of the tail itself, as is seen in some embryos. This singular formation shows that the caudal fin is properly an appendage to the lower surface of the dorsal column, a true second anal, and not the proper termination of the column. The specimens exhibited showed their affinity to reptiles, by their motions and attitudes; the spine being more flexible than in ordinary fishes, and their position, when at rest, being frequently more or less bent, particularly towards the tail; peculiarities arising from the ball and socket joints of the vertebræ, — a proper reptilian arrangement. The manner of feeding also is unlike that of fishes, and resembles that of reptiles. Other fishes take their food with open mouth, and swallow it at once; but this one approaches its prey slyly, sidewise, and suddenly seizing it holds it in its jaws, until, by a series of movements, it succeeds in getting it into a proper position for swallowing, as is the habit with alligators and lizards. The ball of food in the body of this fish is seen to move gradually, as it distends the body in its progress, from one end to the other, as is seen in snakes. This fish is also remarkable for the large quantity of air which escapes from its mouth. The source of this Prof. Agassiz had not been able satisfactorily to determine. At certain times it approaches the surface of the water, and seems to take in air, but he could not think that so large a quantity as is seen adhering in the form of bubbles to the sides of the gills could have been swallowed, nor could he suppose that it could be secreted from the gills themselves. These different interesting facts were noticeable in the specimens exhibited, which were fed for the occasion on live minnows, the only food they could be persuaded to take.

Dr. A. A. Hayes read by its title the following paper —

ON THE STATE IN WHICH PHOSPHATE OF LIME EXISTS IN SEA-WATER.

In a description given to the Society of a consolidated phosphate of lime, arising from the action of atmospheric agents on the arenaceous remains of the fish food of fowls of the Atlantic islands, I alluded to the chemical process by which this solid was formed. The solubility of the altered material, in water, was also pointed out, the experiments on which these statements were founded having been made two years earlier. At the time of exhibiting some remarkably pure depositions from sea-water, containing phosphate of lime, at a later meeting, want of time prevented me from showing how phosphate of lime exists in sea-water.

When bones of fish and of quadrupeds are moistened with sea-water, or pure water, fermentation commences in the gelatinous parts of tissues present, and, under a disengagement of several of the volatile oily acids and ethers, a considerable mechanical change takes place in the bones.

Similar effects attend the changes when the bones are wholly immersed in water; and if the temperature of the surrounding air is 85° F., after the lapse of six or eight days, the turbid fluid, containing fatty and crenic acids, holds in solution a portion of phosphate of lime. A late chemical journal informs me that M. Wöhler, has since made the same observations on ordinary water and water freed from carbonic acid, with the same results; and he deems them important to agriculturists, who can dissolve their bones in water and apply the solution as a fluid fertilizer.

Interesting as this fact of the solution of bones in sea and common water is, the explanation of how it takes place has called for numerous experiments, and the truths arrived at apply to the explanation of other phenomena of interest.

Bones immersed in sea-water, ordinary water, or boiled water, dissolve to a very slight extent; rarely more phosphate of lime is present than is due to the simple solution of bone-phosphate of lime in gelatinous fluids. It is to a subsequent action that the increased quantity of bone-phosphate is owing, and this action arises from fermentation. The bones containing gelatine quickly enter into fermentation or putrefy, and the bone-phosphate of lime, consisting of three proportions of lime to one proportion of phosphoric acid, is presented to the fluid containing carbonic and crenic acids. These acids unite to the lime of the bone-phosphate, and separate, forming carbonate and crenate of lime. By losing in this way one proportion of lime, the phosphate with two proportions of lime is left, and this, much more soluble than bone-phosphate, remains in solution. As the fermentation proceeds, more lime is removed from the phosphate dissolved, until two proportions of the three usually found in bone-phosphate are actually combined with the other acids. In this fluid, bone-phosphate of lime dissolves to a greater extent than in water, and in the experiments we find it present, so long as excess of bone-phosphate remains. Some experiments have shown that the carbonic and crenic acids have the power of removing still more lime from the mono-phosphate remaining, so that the solutions approach the state of phosphoric acid dissolved and carbonate and crenate of lime deposited. This complex action has heretofore escaped attention, probably from the fact that on adding solution of ammonia, bone-phosphate of lime falls, and this quantity of bone-phosphate was *assumed* to be the whole phosphate dissolved. If, however, the liquor from which the bone-phosphate has been removed, be treated with solution of double chloride of calcium and ammonium, a much more voluminous precipitate is obtained, arising from the combination of free phosphoric acid with the new proportion of lime added. There are other chemical relations of interest, but I advert to one only,— *the solution containing the mono-phosphate, and even phosphoric acid. from the fermenting mass, is slightly alkaline, and it does not lose this character when heated to the boiling point;* — long boiling, with evaporation, gives rise to acidity, which manifests itself slowly but decidedly. We can now explain the solution of the phosphate of lime in the neutral fluids of the tissues in health, and in the secretions and excretions where its presence is indicated generally.

In sea-water, and in bittern even, bones decompose and dissolve, but the act is never one of simple solution after the organic changes commence. An elimination of lime by acids momentarily present, converts the bone-phosphate into mono-phosphate, which is a soluble salt, and can exist under the conditions in presence of carbonate of lime and magnesian salts. No difficulty attends the experiment of thus separating from sea-water a phosphate containing at least three proportions of phosphoric acid to one of lime, there being present at the same moment in solution, the ordinary tris-phosphate, and in this mixed state the salt uniformly exists. In precipitates produced in boiling sea-water, and in our analyses, we estimate the phosphoric acid as a bone-phosphate salt, which is not strictly a correct statement. The results here given allow us to readily explain by simple solution and evaporation the conversion of the granular and finely divided fish bones into a solid, compact rock, where all traces of its granular form are lost.

The President gave an account of some fossil bones collected in Texas. For these the Society is indebted to the liberality of Dr. Charles Martin, Surgeon U. S. Navy. They were purchased by him while attached to the Coast Survey during the winter of 1855–56, at the mouth of the Brazos River. They were discovered in the bed of the river, during its low stage, about fifty miles from the coast. The collection is very valuable and interesting, not only as representing three distinct races of gigantic quadrupeds, but as indicating a new locality in the geographical distribution of the animals to which they belonged. It is not a little remarkable that three such genera as Mastodon, Elephant, and Megatherium, should be represented in a collection of no more than eight specimens taken at random. Six of the eight appear to have undergone similar changes of density and mineralization; these are the Symphysis of the lower jaw, an ultimate Molar, and the Femur of an Elephant, the Tibia of Megatherium, and the two Molars of a Mastodon. The others are lighter colored, and much less dense. Coming as they do from the bed of a river, it is impossible to determine how far they were originally associated in the same geological formation. It is not impossible that those first mentioned were from the same locality.

1. *Symphysis of the lower jaw of an Elephant.*—The branches of the jaw were broken off on both sides; that of the right a little in advance of the alveolus, and that of the left just at the alveolus. The fragments of the branches now remaining form an open angle of about 112° to 115°. The depth of the symphysis on its inner face is about five inches. The channel or groove which is continued over the upper border of the jaw on the median line, and descends towards the chin in front, is quite short and reaches but little below the upper edge of the jaw.

The point of the symphysis is broken off at its base, but the fractured surface indicates that it was only very imperfectly developed. When compared with that of *Elephas primigenius*, the chin is less prominent and the point not so much depressed.

2. *Upper Molar of Elephant.*—This has been much injured by having been exposed in the bed of the river; the fangs are all broken off, and a portion of its anterior extremity has been destroyed, so that its original size cannot now be ascertained. What the entire number of plates was on this tooth previous to its coming into use it is also impossible to say. The fact, however, that all but four have become abraded, indicates that it had been a long time in action. Its shape and proportions indicate that it was an ultimate molar from the upper jaw.

The following table gives the dimensions and weight of the tooth as compared with those of a right and left corresponding molar discovered at Zanesville, Ohio, and now in the collection of the late Dr. J. C. Warren.

	Zanesville right upper molar.	Left upper molar.	Upper molar, Brazos.
Greatest length	13¼	13½	14
Height when resting on the grinding surface	10½	11	8½
Length of grinding surface . . .	8¾	9	10
Breadth of grinding surface . . .	4¼	4¼	4¾
Whole number of laminæ . . .	29	30	19
Laminæ of grinding surface . . .	18	18	15
Weight in pounds and ounces . . .	15	17	19¼

From the above comparisons, it will be seen that while the dimensions of the three molars vary but little, the number of plates is quite different in the specimen from the Brazos from what it is in those from Zanesville; there being from 10 to 11 more in the latter than the former. Is this a mere variation, or is it an indication of a specific difference? This question cannot be answered until we know more accurately than is now known, the normal range of variation in these animals. So great a variation as this in one and the same species has not as yet been noticed.

3. *Femur of Elephant.*— This comprises only the lower half. It is that of an animal fully adult, and belonged to an individual of small size; the shaft of the bone is more round than that of Mastodon. Compared with that of the Cambridge skeleton, at corresponding parts, the transverse diameter of the latter is $5\frac{1}{8}$ inches, and the antero-posterior 3 inches; of the fossil, the first diameter is 4 and the second $2\frac{3}{4}$ inches. The condyles examined from behind are longer in a vertical direction and of a more uniform width in the Mastodon than in the fossil elephant. This animal must have been of very small size — probably not exceeding eight feet in height — and, as it is fully adult, must have been very much smaller than the individual from which the molar was derived.

4. *Lower extremity of a Right Humerus of Mastodon?* — This belonged to an animal of large size. The outer condyle is partially broken off; breadth across condyles 10 inches.

5. *Ulna of the same.*

6. *An ultimate or sixth upper molar of Mastodon giganteus*, as shown by its gradual contraction from before backwards. It is incomplete; there are four ridges remaining, but the anterior extremity is fractured. It is thickly invested with crusta petrosa between the bases of the ridges. Its greatest breadth is $4\frac{1}{8}$ inches. It diminishes in size from before backwards.

7. *An ultimate lower molar.* — It is longer and narrower than the preceding, as is usually the case with lower molars compared with upper.

Length	$7\frac{4}{8}$	inches.
Breadth	$3\frac{3}{8}$	"

These two teeth have a similar aspect, and may have both been derived from the same individual.

8. *Tibia of Megatherium.*— This was from the left side, and consists of the lower half. The inferior extremity is well preserved. The inner tuberosity, which is thick, rounded, and indented for the attachment of ligaments, exhibits on its posterior face two grooves for the passage of the tendons of the flexor muscles of the foot. These are both much less deep than the groove seen on the corresponding portion of the tibia of the Mylodon. The outer border of the bone is thinner, and presents a rough, fractured surface, caused by the breaking off of the fibula, which, in Megatherium, is anchylosed with the tibia.

The articulating surface corresponds with that of the same part in the Megatherium. It consists of two deep depressions, separated by a sharp ridge ; the inner depression is a segment of a nearly spherical surface, and the outer forms a broad groove of considerable length, and traverses the end of the bone obliquely from before backwards and inwards. These surfaces correspond with the peculiar configuration of the astragalus, which in Megatheroid animals is quite characteristic.

The dimensions of the fragment are as follows: —

	Inches.
Breadth at the lower extremity	13
Thickness of do	8
Breadth of upper extremity, fractured . . .	8
Thickness of do	4.5
Transverse diameter of spherical concavity . .	4
Antero-posterior diameter of do . . .	4.7
Transverse diameter of elongated articular surface .	4.7
Antero-posterior (oblique) do .	9.5

The circumference of the bone around the lower extremity, without the fibula, is two feet seven inches ; that of the Madrid specimen *with the fibula* is 2 feet 6¼ inches.

The breadth of the Madrid specimen *with* the fibula is 12½ inches, and that of the specimen from the Brazos River, *without* the fibula, is 13 inches. The latter, therefore, must have belonged to a much longer animal than the former.

In North America, the Megatherium has hitherto been found only in two localities, viz: Skiddaway Island, on the coast of Georgia, and on the banks of the Ashley River, in South Carolina. Dr. Leidy, in his Memoir on the Extinct Sloth Tribe of North America, gives a list of all the remains of the Megatherium which have been discovered in the United States ; the upper half of a tibia is described, but in no instance is the lower portion mentioned. Since the animals, whose structure is known, from North and South America, are of different species, he thinks the North American Megatherium forms a distinct species, which he calls *M. mirabile.* I have had no means of making a direct comparison of the bone from the Brazos River with the corresponding part of the skeleton from South America ; and as the same portion of bone from the *M. mirabile* has not yet been discovered, I am unable to say whether the species is identical with either of the others or not.

Mr. John Green read a paper entitled —

SOME OBSERVATIONS ON THE STRUCTURE OF BONE IN PYTHON.

The ribs of Python are hollow, without cancelli, except at the vertebral extremity, and in thickness they are about one fifth or one sixth of the diameter of the bone. In the macerated and dried bone, the cavity contains only adipocire and some remains of a lining membrane. The nutritious artery enters near the vertebral end of the rib, and passes directly through into the medullary cavity.

The vertebræ are made up of a very dense osseous tissue, with cancelli in the upper and posterior parts of the bodies, and in the interior of the spinous processes, and to a small extent in the arches on each side of the great foramen.

The microscopic structure of the ribs is remarkable in the total absence of Haversian canals. The lacunæ and canaliculi are distinct, and the lamellar structure well marked. The lamellæ are arranged in two series, the first (fundamental lamellæ of Kölliker) parallel to the external surface of the rib, and the second series concentric with the medullary cavity and cutting off many of the first series at an acute angle. This internal series of lamellæ appears to be a secondary deposit, taking place after the formation (by absorption) of the central cavity, and is homologous with the lamellæ of the Haversian canals in human bones, the medullary cavity itself corresponding to the Haversian canal.

Under the microscope, the vertebræ present lamellæ for the most part parallel with the exterior of the bone, with lacunæ and canaliculi well marked, but with a few canals which in the bodies have an antero-posterior direction, and pass directly through the thickness of the bone. These canals vary considerably in size, do not branch or anastomose, and are generally not surrounded by lamellæ, although, in a few canals, one or two lamellæ have been observed. The lacunæ correspond in arrangement with the lamellar structure of the bone, and are entirely independent of the canals.

Dr. Weinland read a paper on the motions of animals as regarded from a psychological point of view.

The President stated that, within a few days, he had made an experiment, upon a mouse, of the poisoning powers of one of the living Rattlesnakes belonging to the Society.

The mouse when put in the case with the snakes showed no particular signs of fear, but occupied itself apparently in searching for the readiest way of escaping, in the course of which it repeatedly approached the reptiles, and sometimes crossed over them. After being repeatedly struck at, it was wounded by one of them, and died tetanic in the course of two minutes. It was then taken from the case for the purpose of making an examination of the state of the blood. On being opened, the animal proved to be a female far advanced in pregnancy, and the interesting fact was noticed that the fœtuses were alive for fourteen minutes after the mouse was wounded; the poison acting much more promptly on the latter than the former,—a circumstance not easy to be accounted for;—in reality the arrest of the circulation was as likely to have been the cause of death in them as the poison.

The Secretary inquired whether the arrest of the respiratory function by the tetanus might not have been the cause of death in the parent; a cause which would not directly act upon the young?

Dr. Wyman replied that he could not answer positively upon this point,—the tetanus was universal.

After the body had been examined, it was returned to the case with the snakes, and was swallowed in due time by the one which had bitten it. The process of deglutition seemed to be performed entirely by means of the upper jaws. On the fourth day after being swallowed, the animal was voided entire, without having been digested.

Prof. Agassiz spoke of a new work on Fishes by Dumeril, which was in process of publication in a costly and elegant manner. As to its scientific value it was entirely behind the present day, and might as well have been written thirty years ago as now. Prof. Agassiz proceeded to notice in detail many defects in the system of classification, pronouncing it a work entirely unworthy of confidence as scientific authority, and quite inconsistent with the reputation of its author.

Dr. Henry W. Williams was elected a Resident Member.

October 15, 1856.

The President in the Chair.

Dr. C. T. Jackson stated that at the meeting of April 2d, a communication was received from Mr. Edward Daniels of Illinois, upon a supposed conversion of human bones into phosphorus. Since that time the supposed bones had been shown to be the phosphorus of commerce; but they resembled the long bones of a child, having an enlarged extremity not unlike a condyle, and a central canal, which is not uncommon in stick phosphorus, resembling the medullary canal.

Dr. Weinland made the following remarks upon the Corrosion of the Shells of Freshwater Clams:

It is generally believed and stated in the books, that the corrosion of the shells of freshwater clams, which is observed upon the beak, and which frequently extends over the whole surface of the shell, as in Unio complanatus, Anodonta implicata, and Lampsilis radiata, for instance, is effected by the dissolving properties of fresh water when impregnated with carbonic acid. It is supposed that the carbonate of lime is converted into the bicarbonate, and in this state dissolved by the water. This process may sometimes take place, but it does not seem to be the commencement of the corrosion. In all the specimens of Anodonta implicata which he had recently collected at Fresh Pond, (about sixty) he found little holes, or channels, from one to three lines in length, piercing the epidermis, and presenting sharp edges, such as would not have been likely to result from a chemical process. Moreover, he found in many of these holes small worms, and therefore he was inclined to suppose that they commence the process of corrosion in the shell ; that they perforate the epidermis, and after the removal of this, the chemical process above alluded to may take place. How far the same supposition may prove true with regard to sea-shells he was not prepared to say.

The President offered some remarks on the morphology of the urinary bladder of Batrachians.

From observations which he had recently made, he thought it questionable whether they belonged to the group of Anallantoidians, with which they had been generally classed. He compared the urinary bladder of Frogs with that of Fishes and Scaly Reptiles, and showed that structurally it resembled that of the latter group. He was inclined to regard it as a rudimentary allantois, inasmuch as it had the same anatomical relations to the intestine and vascular system that the allantois has.

Mr. C. J. Sprague exhibited specimens of *Cyclomyces*, recently collected by Mr. Denis Murray in the vicinity of Boston, and made some remarks upon the peculiarities of this genus of Fungi.

There are three principal arrangements of the spore-bearing apparatus in the common table-formed fungi, which are so distinct as to be generally known to unscientific observers ; viz : in radiating, thin plates, as in *Agaricus ;* in vertical pores, as in *Polyporus ;* and in vertical spines, as in *Hydnum.* The genus *Cyclomyces* exhibits a series of narrow concentric plates from the stipe to the margin, like seats in an amphitheatre. The genus comprises but very few species, only one of which has been detected in America, the *Cyclomyces Greeneii* found by Mr. B. D. Greene in Tewksbury. A concentric arrangement of spines is sometimes observed in some *Hydnums.*

Dr. Durkee exhibited a specimen of Goliathus giganteus, from Africa. The wings, drawn out from beneath the elytræ, measured four and one half inches from tip to tip.

The following named gentlemen were elected Resident Members, viz: Alfred E. Giles, I. T. Talbot, of Boston; Ambrose Wellington of Cambridge, A. T. Cummings of Roxbury, and Edwin Harrison of the Lawrence Scientific School.

November 5, 1856.

The President in the Chair.

Dr. David F. Weinland read the following paper, entitled

OBSERVATIONS ON A NEW GENUS OF TÆNIOIDS.

In the middle of April, 1856, I found a single living specimen of a new kind of tapeworm in the small intestine of our gold-winged woodpecker (*Picus auratus*). This Tænia is remarkable for the structure of its organs of reproduction.

As in the human tapeworm (*Tænia solium*), so also in this, the genital openings alternate from one articulation to the next; but in the former, and as seems generally to be the case in Tænioids, the testicles lie in the middle of each articulation. (See Von Siebold, Vergleichende Anatomie der wirbellosen Thiere, p. 147; and the figure in Blanchard, Recherches sur l'organization des Vers, pl. 15; f. 4, 7.) They were placed, on the contrary, in the tapeworm of the woodpecker, in the anterior part of the articulation, just in front of the genital opening, filling up by a large mass of convolute spermatic canals all that part of the articulation, and thus excluding from it the uterus. Furthermore, the uterus did not consist of branched, treelike canals, (see Blanchard, l. c.) but on the contrary of a large number of balls, perhaps connected with each other by slender ducts. Von Siebold, l. c. p. 146, and note 23, seems to speak of a similar structure observed by him or Dèlla Chiaje in *Tænia ocellata*, and Dujardin (Histoire naturelle des Helminthes, Paris, 1845) has observed exactly the same structure of the uterus in a tapeworm of the European *Picus major*.

As in other tapeworms, the spermatozoa were very fine, filiform, of one diameter throughout, without the so-called head or body of other spermatozoa. But what was very strange, these spermatozoa were of very different lengths; some twice, thrice, or even four times as long as others. Moreover, they would readily break into pieces, and were not so soft and pliable as they generally are. I saw several break into two pieces, (particularly when coming out from the cirrus-bag,) and both pieces moved on. Whether this phenomenon occurred accidentally, or whether it was a natural characteristic of these spermatozoa, I am at a loss to say. No water was used in the examination, of the bad effects of which upon spermatozoa I am fully aware. In either case this is a subject worthy the investigation of physiologists; for such a power of division would imply a nature in these spermatozoa entirely different from what we have hitherto observed. Other spermatozoa present *individual* elements; on the contrary, those of this tapeworm would be really *dividual*, at least virtually, as they have the faculty of dividing and thus multiplying themselves. Not the slightest difference could be observed, in activity, movement, or form, between the divided portions and the whole animals; so that we may suppose, that each of the divided pieces had the fructifying power, as well as the others. Furthermore, the motion of these spermatozoa was extraordinary. Whilst others move in a peculiar, quick, vibratory manner, these progress much more slowly, in a succession of long curves, reminding one of the motion of an eel at the bottom of a river.

This same tapeworm is also remarkable for the strange shape of its *eggs*. While the eggs of tapeworms generally are globular or oval, the shape of these was that of a large ball running out on both sides into tubes which terminated in balls, of about half the diameter of the central one. I found these eggs in all stages of development, some containing nothing but a clear yolk, while others presented embryos with six little spines. The yolk as well as the embryo was found only in the central ball, and there also the yolk membrane terminated. Thus the lateral tubes of the egg, as well as the balls in which they terminated, are to be considered merely as excrescences and appendages of the outer (the third) coating of the egg. Similar appendages to the eggs of tapeworms have been met with previously by other observers; namely, threads running out on two sides in *Tænia infundibuliformis* and *planiceps* by Von Siebold, (l. c. p. 148,) and *Tænia cyathiformis* by Dujardin, (l. c. p. 568, and figured Pl. 9, Fig. R. 2,) while Von Siebold (l. c.) describes the eggs of the same worm as provided at the pointed ends of their outer pear-shaped coatings, with two bladder-like appendages, which remind one more of the new form just described. Two delicate tufts, one on each side, have been observed by Meissner in *Mermis nigrescens* (Beitraege zur Anatomie und Physiologie der Gordiaceen, in Von Siebold and Kölliker's Geitschrift fur Wiss. Zool. VII. Taf. II., Fig. II.) and by Siebold, l. c. in *Tænia variabilis*. All these appendages belong to the third coating of the egg, adjoining the so-called chorion. Analogous appendages are found in the eggs of sharks and skates. Some of the embryos were hatched under my eyes, and, in spite of the greatly different organization of the adult worms, their organization was seen to be throughout identical with that of the embryos of the genuine Tænias, (those of man, dog, cat, etc.) namely, a roundish disk, containing smaller and larger granules, and provided with six little spines, disposed in three pairs, two lateral and one in front. We might ask here, is it only the simplicity of organization which causes this similarity of such incipient organisms, which are so distant from each other when adults? or is it perhaps rather the real and material expression of the ideal unity of such a type (that of Tænioids, for instance)? The embryos of all Dicotyledonous plants start with a little root and two leaflets, whatever difference they may exhibit, when full grown, in relation to the organs of nutrition, respiration, or reproduction; they may have the complicated flowering of a rose, or the simple perigon of an oak. Thus every Dicotyledonous embryo exhibits materially the unity of that great diversified type. Again the simple cell, from which both animals and plants originate, represents materially that ideal unity which embraces all living beings. If this be so, the question arises, can we extend this principle, which has already laid open or strengthened such natural divisions as Dicotyledonous and Monocotyledonous plants, over all natural groups ? Is it the standard of every type or group? Is it the proof of its foundation in nature, that its members exhibit materially their unity by identity of organization at any time of their embryonic development? We think that it is impossible to answer this question for want of embryological data, but in relation to the Tænioids, which we will call a family, its truth is remarkably evident. We form a natural group of all those Tænias, the embryos of which show that disk-like body with six spines. We might call them Hexechinidæ. Many genera with very different structure in relation to the reproductive organs, the number and disposition of the hooks, the form of the proboscis, &c. &c., are included in it. Even their forms when adult are not the same, but we have a doubt whether we ought not, in basing, as Agassiz has taught us, families upon forms, to make, at least in the lower animals, this allowance, that the guiding form is often not exhibited in the adult animal, but only in a much earlier, perhaps in its embryonic state. We allude here particularly to all those animals in which an alternation of generation is observed, such as Cirripeds, etc.

The *new genus*, which we found upon the structural peculiarities mentioned above, we will call *Liga*, and the species, from its many yellowish-brown dots, *punctata*.

A full description of both genus and species, with drawings, will be given on some future occasion.

Dr. Gould asked if there is around the mouth of the common tapeworm (*Tænia solium*) a row of hooks, as is commonly figured in descriptions of the head of this animal.

Dr. Weinland replied that there is a row of hooks at the base of the proboscis, which move with the invagination of this organ, and which consequently may appear in different positions.

Dr. Gould asked where the embryos of the tapeworm were obtained.

Dr. Weinland replied that they exist in the articulations of the old worm, in all stages of development, and may be removed by incision and pressure upon the joint.

Prof. Agassiz observed that the ova of *Botriocephalus latus*, which is common in Switzerland, may possibly be introduced into the human body by the vegetables used for salad, which are manured with liquid taken directly from the vaults. He was not aware, however, of the ova having been found upon the plants.

Dr. Weinland, in reply to a question as to the manner in which these animals reach the brain and other organs, answered that he had seen, in one instance, a passage through a membrane without any trace being left in it; and that it was not impossible that penetration could be effected through many tissues and to a considerable distance.

Prof. Agassiz remarked that, at a previous meeting, he had stated that it would probably be found necessary to divide what is now called the Class of Fishes into several distinct classes.

He could not yet say what position the Ganoïds would take,—whether that of a separate class or of an order;—but it is certain that they form a natural group. Sturgeons and gar-pikes belong together, though they differ so much in external appearance; and Prof. Agassiz gave, as one of the points of resemblance serving to unite the two, the manner of development of the scales. The small gar-pikes, (*Lepidosteus*,) recently exhibited by him, presented scales just beginning to form. In the youngest specimen there was a row along the middle line of the body; in another, more advanced in age, there was a row of scales above and below the median line also, where the scales first appear. Towards the tail the scales were crowded together, and were of a rhomboidal form, covering the posterior lobe of the body, and extending to the fin rays. The same method of development Prof. Agassiz had noticed in the sturgeon, and the same rhomboidal scales upon the tail. He expects to find the mouth beneath the snout in the embryo Lepidosteus, as it is in the sturgeon, and still other coincidences in the embryonic form.

The President inquired in what order the scales appear in osseous fishes.

Prof. Agassiz replied that he could not answer. He had seen the scales in Salmonidæ extremely small, but never at a sufficiently early period to determine the order of development.

Mr. James E. Mills gave the results of an investigation made under the direction of Prof. Agassiz, to determine more accurately the proper characters of family groups, especially as illustrated in the order of Turtles.

It was readily seen on examination that there were several groups of genera in that order. Whenever the *general form* was considered to be the peculiar character of a group, the whole order became readily divisible into well-distinguished families, and their value as natural groups was easily recognized. By general form, he did not mean vague form, with its particulars so eliminated as to apply to a wider group than a genus from its very indefiniteness; but a form with fixed and definite elements, having their origin in the disposition of the whole structure, a disposition arising from the habits, manner of locomotion, &c. of the animal.

The families thus demonstrated to exist amongst North American turtles are seven, constituting two natural groups, which are distinguished by different modes of locomotion, and the resultant general symmetry, or simplicity, or complication of structure. They are therefore designated as sub-orders, those of Sea-Turtles and of Emydæ. The Sea-Turtles live free in the water, and move principally by means of the front limbs, after a manner very much like the flying of birds; the anterior extremity is reduced to a kind of wing, and the posterior to a kind of paddle. The Emydæ move principally upon the solid surface, either on land or upon the bottom of the sea, and always with both pairs of limbs acting in concert, as in mammals.

Prof. Agassiz observed, that for years he had been endeavoring to remove all the elements of arbitrary classification in the study of natural history, and that he had been aiming at the discovery of complete standards for classes, orders, families, &c. Different naturalists divide the animal kingdom each into a different number of classes, and there is a great discrepancy of opinion as to what the terms order, family, &c., should be applied. His object was to show that the only true and proper classification is that of nature, not of man.

Dr. A. A. Gould read a letter from Mrs. M. A. Binney tendering a certain portion of the library of the late Dr Amos Binney, one of its former Presidents, as a deposit in the library of the Society, upon the conditions given below. The number of works is 353, and the number of volumes, including pamphlets and numbers, 1145.

The conditions are as follows, viz:

1. The volumes to be for the use of Members of the Society and others who may resort to its Library for scientific investigations, and to be subject to the same regulations as are the books of the Society.
2. The volumes shall be designated by a suitable label.
3. Proper care shall be taken to secure them from loss or damage; and reparation shall be made, if required, for losses or injuries not attributable to casualties or ordinary usage.
4. The immediate branches of the family of Mrs. Binney, and such others as they may from time to time designate, shall have the unrestricted use of the books, further than to give the ordinary receipt for such books as they may take from the Library.
5. The deposit to continue in the Library until the books are otherwise disposed of by Mrs. Binney, or those claiming after her.

Dr. John Bacon offered the following Resolutions, which were unanimously adopted:

Resolved, That the deposit of the volumes tendered by Mrs. Binney, be accepted for the purposes and on the conditions designated; and that the Librarian give her a receipt for the same.

Resolved, That this transaction gives peculiar pleasure, on account of the very great aid which will be afforded to the student of Natural History, more especially, as it shows a continuation of the interest which all the members of the family have so long and so generally manifested in the Society; still more, as it recalls the zeal and devotion of our former President, who collected the books, and of the many acts we know he designed and executed for the advance of Natural History.

The Librarian stated that it would be necessary to remove the large slabs of fossil impressions from the library in order to accommodate these works, and the library committee, together with the curator of geology, were instructed to prepare for their reception.

November 19, 1856.

The President in the Chair.

Mr. Whittemore read a letter from Mr. E. S. Morse, of Portland, Maine, giving a description of the smallest Helix ever found. Specimens and magnified drawings of the shell were exhibited. The specimens were referred to Dr. Gould.

Dr. Brewer reported upon the collection of Birds' Eggs made by Mr. E. Samuels in California.

Mr. Sprague reported upon a plant presented to the Society by Dr. Pickering at the previous meeting.

It is the *Amaranthus pumilus,* Raf., which is now placed in a new genus of Rafinesque and called *Euxolus pumilus.* It is poorly figured in Dr. Torrey's Flora of New York, under the old name. The figure represents a young plant with sessile leaves; but the lower leaves are in reality on petioles as long as, or longer than, the blades. They are also retuse and even emarginate and obovate, instead of being, as in the figure, obtusely pointed. Elliott's description is excellent, except that he does not refer to the length of the petioles. Dr. Gray described it under its present name in his recent edition of the Manual of Botany; but, having only a small, imperfect specimen, he says "slightly petioled," and makes no mention of the emarginate blade. The plant is found on sandy shores along the coast from Rhode Island southward.

The genus *Euxolus* is separated from *Amaranthus* on account of the indehiscent or irregularly bursting utricle; that of the latter genus having a circumscissile dehiscence.

Mr. John Green exhibited under the microscope a portion of epidermis from the border of the mouth of *Pristis sagittata*, containing teeth in immediate juxtaposition with the placoid scales which cover the body of the fish. He called attention to the perfect identity of structure in the two cases, viz: a cavity or depression in the under surface of the tooth or scale, and tubes ramifying in its substance. The only difference is in size and form, the teeth being two or three times the size of the scales, and triangular in outline, while the scales are nearly circular.

The President announced the presence of Dr. Brown-Séquard, and invited him to address the Society.

Dr. Brown-Séquard expressed his thanks for the courtesy extended to him, and proceeded as follows: —

Experiments have lately been made to determine if the introduction of air into the chest, through the respiratory passages, with great force, does not have some influence upon the action of the heart; and it has been found that there is a diminution in the frequency of the heart's action, sometimes to such an extent, that the pulsations amount to only two thirds the normal number.

The explanation which has been given to this phenomenon is based upon mechanical grounds, but M. Séquard thinks if this explanation be correct, it is so only to a certain extent. One other cause at least, that of a nervous influence, he has demonstrated to exist.

It is well known that some mammals resist asphyxia for a long time, making efforts to breathe, often for several hours, when the entrance to the lungs is closed. Now it is found that when the chest of an animal in this condition is opened and retained in such a position that there can be no motion and no mechanical action, the diminution of the pulsations persists. The phenomenon is then due to the action of the *par vagum nerve.* It is found that when this nerve is irritated at its root or galvanized, the action of the heart is arrested; in this respect differing from the other muscular organs, which are excited to action by irritation or galvanization of their nerves. When the chest is opened, without injury to the par vagum, there is seen to be a control over the action of the heart during inspiration. But if the par vagum of both sides of the chest be cut across, this control is lost. There is good ground for belief, therefore, that at every effort of inspiration, there is a transmission of nervous influence along the par vagum to the heart, acting as a check upon it and regulating its action, and thus preventing the increase of pulsation, which might otherwise go on, in increased ratio to infinity, under the excitement of forced respiration.

It has been said that people have killed themselves by stopping the heart's action. One of the brothers Webber, of Leipsic, found that when an effort was made to contract the chest during a full inspiration, that there was great suffering, fainting, and almost death. Webber himself nearly lost his life trying the experiment. By irritating the various organs which receive branches from the par vagum, as the stomach, spleen, &c., by galvanizing them or crushing them at once by a blow of a hammer upon an iron surface, it is found that the heart's action is diminished in frequency, and in some instances entirely suspended. Cases of sudden death from a blow upon the stomach externally are to be attributed to the same cause. The action upon the heart from overloading the stomach, either with too much solid or liquid matter, is to be explained also by the influence of the par vagum upon the heart.

Dr. Séquard also referred briefly to his researches upon the Supra-renal Capsules. These two small organs, lying in immediate connection with the kidneys, have been considered very unimportant until within a few years. Now it is found that, when they are removed from the body of a living animal, there occurs a very great change in the blood, and the animal dies in a short time,—sooner even than after the removal of the kidneys. There is found also to be an accumulation of pigment and a peculiar form of crystals, (not having the chemical reactions of hæmatoidine.) in the blood.

Dr. Gould called attention to the remarks of M. Séquard as interesting in a pathological point of view. He had recently attended a case of what he regarded as "*bronzing of the skin*," a disease lately recognized and described by Dr. Addison, of London, who has found in cases of "*bronzed skin*," an alteration of the supra-renal capsules. In Dr. Gould's case, however, there was no alteration of the capsules, but there was granular degeneration of the kidneys.

Dr. Gould inquired if the real use of these organs had been discovered. The effects of their absence are well known.

Dr. Séquard replied that his hypothesis was that the function of the supra-renal capsules was to prevent the formation of pigment in the blood, and he thought he had isolated a substance from the blood which would be changed into pigment were it not for the action of these organs. This substance, perhaps, may be produced in such a quantity that the capsules cannot destroy it, even when they are in a healthy state. In the cases of "*bronzed skin*," the coloring matter of the skin, as examined under the microscope by himself in Paris, and by Dr. Dalton in New York, proved to be the same as in the skin of the negro; and, as in the blood in the same disease, pigment-cells, pigment-granules contained in a transparent substance different from fibrine, and peculiar crystals of an unknown substance, just referred to, are found, he thought there was some ground for the hypothesis that these organs are pigment-destroying agents. He had seen the crystalline plates sufficiently large to become impacted in the capillaries and prevent circulation of the blood, and consequently he believed if they were not the prime cause of many disturbances of the nervous influence, they should at least be considered a partial cause. He had likewise observed an absence of blood-discs in the vena cava, which would imply a great alteration of the blood.

The President inquired if there were any bronzing of the skin in anencephalous fœtuses, where there is a relatively small development of the supra-renal capsules.

M. Séquard replied that the absence of bronzed skin in such cases might be explained by the capsules of the mother supplying the place of those of the fœtus in utero in purifying the blood from pigment. He had experimented upon guinea-pigs, and had found that life was sustained for a longer period, viz: fifteen and a half hours, on an average, in the pregnant animal, than in the non-pregnant condition, viz: thirteen hours.

Dr. Abbot asked if the capsules had been examined in the negro.

Dr. Weinland suggested that the capsules should be examined in those animals which change color in the spring and fall.

The Corresponding Secretary read the following letters recently received :—

From the Royal Society, London, March 8th, Royal Geographical Society of London, Nov. 17th, 1855, and the Regents of the University of the State of New York, acknowledging the receipt of the Society's publications; Die K. Bayerische Akademie der Wissenschaften, June 20th, 1856, presenting certain books; Reale Accademia delle Scienze di Napoli, April 10th, 1854, presenting its publications, and acknowledging the receipt of those of the Society; Royal Geographical Society, London, June 12th, 1856, presenting its Journal, Vol. 25th; Société de Geographie, Dec. 31st, 1856, acknowledging receipt of the Proceedings of the Society; and from the Secretary of State, Oct. 2d, 1856, forwarding a box of books, in compliance with the request of Dr. John McClelland, Calcutta.

M. Auguste de Jolis, President of the Society of Natural History, at Cherbourg, France, was elected a Corresponding Member.

December 3, 1856.

The President in the Chair.

Mr. Sprague read a letter from Prof. Baird, and made a final communication upon the expedition of Mr. Samuels to California. The subject of a publication of the results of the expedition was referred to the publishing committee.

The President introduced to the Society, Capt. W. M. Gibson, who, during a recent visit to the East Indies, especially Sumatra and Borneo, and the neighboring islands, had an opportunity of observing the races of men and of anthropoid animals.

Capt. Gibson gave an account of the Orangs, and a description of one which he saw, which had been captured in a trap, and which he said was employed in labor by its owner. The animal was six feet in height and covered with hair, which was very short upon the head. These orangs live in the trees, upon platforms of bamboo sticks, and have for weapons rudely pointed poles, with which they spear fish.

According to Capt. Gibson, the term *orang* signifies the same as the Latin *homo*, and is applied by the natives to the human race as well as to monkeys; a specific name being appended to the word orang to signify man, a second for woman, and a third for each species of monkey.

Capt. Gibson also adverted to the possessions of the Dutch in Java, Sumatra, and Celebes, and called attention to Gililo, Mindanao, and other islands east of Java. In reply to the questions of several gentlemen, he indicated the very limited range of the commerce of the United States in this region, and represented that it could be vastly and advantageously increased.

Capt. N. E. Atwood, of Provincetown, presented a fish, taken off the eastern coast of Newfoundland, in from forty to fifty fathoms of water. He supposed it to be an undescribed species, possibly belonging to the family with *Scopelus*, which fish it resembles in the silvery spots upon the abdomen. It was abundant in the fishing-grounds, as the codfish were filled with them.

The President exhibited a fœtal porpoise presented by Capt. Atwood, and called attention to the embryonic condition of the jaw, which was at right angles with the vertebral column, and to the peculiar form of the tail.

The President made some observations upon certain points in the anatomy of the Blind Fish of the Mammoth Cave.

In examining the structure of the ridges upon the head, he had found each ridge to consist of a series of papillæ, lying close together, and beneath them a branch of the fifth pair of nerves, sending off smaller branches, and forming a very sensitive plexus for each papilla. The larger fish also present the same ridges and minute structure along the body between the head and tail.

He had also found in the same specimens rudimentary eyes, as formerly described by him; and he had dissected out also several muscles, or bundles of muscular fibres, on each side of the eye. The stomach of each of the specimens contained a fish with large eyes in a partially digested condition. As far as he knows, this is the first instance of a fish with eyes being found in the Cave.

Capt. Atwood observed that it was very common for many fish to eat their own species. Small mackerel are always found in the stomachs of large mackerel when they are abundant.

Dr. Gould reported upon the communication read at the last meeting from Mr. E. S. Morse, of Portland, Me., on a species of *Helix*.

This species, the most minute of any yet observed, was found by Mr. Morse in the vicinity of Portland, and has been collected also at several localities in Massachusetts. Dr. Gould considered it to be the species described by Mr. Lea, under the name of *Helix minutissima*. It was regarded by Dr. Binney as the young of *H. minuscula*, but Dr. Gould believed it to be a distinct species.

George N. Lawrence, Esq., of New York, was elected a Corresponding Member.

December 17, 1856.

The President in the Chair.

The President, in accordance with a vote passed at the Annual Meeting, read a Memoir of the late President, Dr. John C. Warren.

NOTICE OF DR. JOHN C. WARREN, READ BEFORE THE BOSTON SOCIETY OF NATURAL HISTORY, DEC. 17, 1856.

The resolutions which were passed in this and other Societies, on the occasion of the death of our late President, his public funeral, the expressions of the press, and, above all, the impression which the announcement of his decease made upon the community, are sure indications that a man of no ordinary claim upon public attention had passed away. The explanation of this feeling, and of these honors, is to be found in a life of entire devotion to the duties of his profession, and to the various relations in which he was publicly or privately placed. What these relationships were, and how he sustained them, can receive here but an inadequate notice; yet the duty devolves upon us of placing upon the records of our Society some account of his history, some acknowledgment of his services to us, and some notice of his scientific labors.

John Collins Warren was born in Boston, August 1, 1778, and was graduated at Cambridge in the class of 1797. He was distinguished as a general and classical scholar, was of a genial disposition, active, influential, and highly esteemed by his fellow-students, who conferred upon him nearly every office of honor in their gift. He was elected class orator, and, according to the custom of the times, pronounced his oration in Latin.

He studied medicine under the direction of his father, Dr. John Warren, who had attained great eminence as a skilful surgeon, and is still remembered by those who listened to his instructions as an admirable teacher and an eloquent lecturer. Having finished his labors as a pupil at home, the son visited the great medical schools of France and England. In London, he followed the instructions of the elder Cline and of Sir Astley Cooper, with the last of whom there grew up a friendly acquaintance, which continued until the death of the great English surgeon. In Paris, he became a pupil and an inmate in the family of the celebrated Dubois, and attended to the instructions of Dupuytren, who was then just commencing his distinguished career, and to the teachings of Chaussier, who as an anatomist had acquired a world-wide reputation. On returning to his native country, he entered at once ardently into the pursuits of his profession, and it is in the professional career that we should follow him if we would form the more complete estimate of his life and character. It was this that called forth his greatest devotion, and brought him most in contact with his medical brethren and the world ; but I must be brief.

By incessant labor, by the exercise of a strong will, which few could resist, by unwearied attention to all the minuter details of his calling, he became the most distinguished of New England surgeons, and attained to a high reputation both at home and abroad. He was bold but cautious, and never allowed himself to meet his case unprepared. Those who have seen him in the theatre, going through the task of a serious operation so steadily and so easily, have probably thought but little of the hours of preparation that preceded it. He handled the knife gracefully and skilfully, especially in operations connected with deep-seated parts, which require a good knowledge of surgical anatomy and accurate dissection. These, more than all others, try the firmness and self-reliance of the surgeon, and in these he excelled. One of the originators, and for many years a surgeon of the Massachusetts General Hospital, its wards and theatre have witnessed the rigid performance of every duty, and have become the surgical centre of attraction for a large portion of New England. Many societies, domestic and foreign, enrolled his name in their lists. As President of the Massachusetts Medical Society, he received the highest honor in the gift of the profession of his native State, and a few years before his death he received the high distinction of foreign membership of the Imperial Academy of Medicine in Paris.

In 1806, he was appointed adjunct Hersey Professor of Anatomy and Surgery, the office of professor being held by his father, to whom he succeeded in 1818, and continued to perform the duties of the office till 1847, when, at the age of 70, after a service of forty years, he resigned.

He was not the slave of habit; no new operation was announced, nor any new instrument invented that did not at once arrest his attention. He was always ready to give novelties and innovations a fair trial. His readiness to embark in the introduction of etherization was characteristic. As soon as the subject was brought fairly to his notice, he improved the first opportunity to make a practical use of it, and performed the first operation, beyond the extraction of a tooth, which it had fallen to the lot of any surgeon to do, upon a patient in the condition of induced anæsthesia. He was immediately followed by others, and with a rapidity previously unknown in the history of innovations, etherization was adopted all over the world. To take the step which he and others took, required no ordinary firmness. Now, that all are familiar with it, it is not easy to go back to the position in which they then stood. In weighing the probabilities, until the experiment was fairly tried, it could not but have occurred to those by whom this boon was conferred on mankind and to him, that the lost consciousness might never return, that the deep sleep which they had induced might be the sleep of death.

As a human anatomist, a pupil of Chaussier, he had taken for his model the French standard of descriptive anatomy. His lectures, whether on Anatomy or Surgery, were always conducted with great method, and were strictly demonstrative. He appreciated the value of comparative anatomy, and introduced it as far as practicable into his lectures.

While Professor of Anatomy, he devoted much time, labor, and money to the formation of a museum, which, on his resignation, was presented to the Massachusetts Medical College, and with it a handsome endowment for its care and increase. Under the scientific direction of its present faithful and indefatigable Curator, it has become one of the most useful anatomical museums in the country, and is the best visible monument to the memory of its founder.

An important service rendered by Dr. Warren to science, and which should not be overlooked, was the effort he made in behalf of the Anatomy Act. Until the year 1829, no provision had been made for legalizing the study of human anatomy. Then, except in rare instances, to have a dead body in one's possession was, in the eye of the law, an offence against society. Physicians and students were dependent for anatomical instruction upon *post-mortem* examinations, on criminals who had suffered the extreme penalty of the law, but mostly upon bodies furtively obtained. This state of things gave rise to the practice of body-snatching, the history of which in this community, could it be fully and faithfully written, would bring to light the story of many a high-handed adventure. In connection with a movement made under the auspices of the Massachusetts Medical Society, Dr. Warren labored to procure the enactment of a suitable law. To this end he gave a public lecture before the legislature, and attempted to demonstrate the absolute necessity of some provision for legalizing the study of anatomy. We are now enjoying the benefit of the services rendered at that time by himself and others.

In accordance with the views which he had advocated many years before his death, he made especial provision for the dissection of his own body, and gave specific directions as to the morbid appearances to be sought after, the preparation of his skeleton, and its final resting-place in the museum which his industry had accumulated and his munificence had endowed. At the time he formed this resolution, such an act would have had a vast and favorable influence in satisfying the popular mind with regard to human dissections. In the latter part of his life, the necessity for such an example had passed away, but "*virum tenacem propositi*," he never receded from his determination. He has followed the example of Scarpa, Jeremy Bentham, of the Meckels, and of the seven professors of Padua.

In 1847, the same year in which he retired from his professional duties, he was elected President of this Society. He came amongst us at our earnest solicitation, at a time when he had finished the life-long labor of a profession which had engrossed all the energies of his manhood, and at a time, too, when most men, from impaired strength and energy of purpose, seek for complete repose. But he preferred to be active. He was not one of the restless spirits who continue to act because they cannot help it;

both mind and body were systematically regulated and made subservient to his indomitable will; he continued to work because he had determined that he would.

He entered at once actively into the interests of our Society. We all know how punctually and faithfully he performed the duties of his office. Soon after his election, and in a measure through his instrumentality, a movement which had been commenced by his predecessor was completed, and the building now occupied by the Society was secured and purchased, and in recognition of his important services on that occasion a vote of thanks stands recorded in our Proceedings. On all occasions he exhibited a strong desire to promote our interests. Unless absent from town, or sick, we rarely missed him from his place. He attended our meetings with pleasure, and enjoyed the association with its members; and we may gratefully recall to mind the fact, that one of the last acts of his life was to invite us in a body to partake of the hospitality of his house.

We are indebted to him for many valuable donations, scientific and pecuniary; among the former, numerous fossils, casts, and skeletons of zoölogical or paleontological interest; the rare and instructive specimens of the skin and skeleton of the Manatee from Florida, deserve especial mention. One of the most valuable additions ever made to our cabinet was effected mainly through his instrumentality and that of the late Hon. Abbott Lawrence, then Minister to the court of St. James, viz: the series of casts of the Sivalik fossils, prepared for distribution among scientific bodies by the Honorable East India Company. The originals of this series were obtained from one of the most remarkable geological regions known to naturalists, where a whole fauna of extinct Pachyderms, Ruminants, Carnivora, with a vast variety of other animals, have been brought to light; and what is still more remarkable, there has been demonstrated the coexistence, in former geological times, of numerous species of Mastodons and Elephants in one and the same limited geographical area.

In becoming the active head of this Society, his attention and interest were at once zealously directed to the study of natural history. His mind, which had been before almost wholly engrossed by his profession, was now directed to other and more alluring paths, and his numerous communications on fossil bones, footprints, and on rare and remarkable animals, show how completely his thoughts were occupied by them. Although it was during his presidency that his principal labors in natural history were accomplished, nevertheless, he had from time to time published articles on various scientific subjects, which indicated the interest he took in matters akin to natural history and comparative anatomy. Among these may be especially mentioned the annual address pronounced before the Massachusetts Medical Society, entitled a Comparative View of the Sensorial and Nervous Systems of Man and Animals.

In this discourse, after having given an exposition of the philosophical views of Cuvier in relation to the structure of animals, he passes in review the various modifications which the nervous system undergoes in the zoölogical series, and concludes with certain physiological inferences, and among them the following: —

"That the brain is not the source of muscular power; this conclusion is founded on the consideration of the disproportion of the size of this organ, and the muscular strength of various animals. In the horse, the brain is small, and the muscular vigor great; in the great sea shark, (*Squalus maximus*,) the brain, compared with the body, is near the smallest among vertebrated animals."

"Muscular power does not take its source in the nerves, as is shown by the non-existence of nerves in animals capable of moving. In the gelatinous polypi, and some of the zoophytes, no nerves have been discovered, and we are, from their texture, led to believe it impossible that they should have any such nerves as other animals, yet they move, some of them, with considerable rapidity."

"The brain is the common centre for receiving the impressions of the senses transmitted by the nerves, and is therefore called the sensorium commune, and where there is not a proper brain, the ganglion which supplies the place performs the same office."

"The comparative view of the sensorial and nervous system does not seem to support the opinion that the difference in the intellectual faculties of men and animals is to be explained by difference in organs alone."

A part of the discourse is devoted to a subject then quite new in American science, viz: to the anatomical characteristics of the crania of the North American Indians, and to a comparison of the skulls found in the mounds of the West with those of the other aboriginal races. I believe some credit belongs to him as being among the first, if not the first, to point out, on anatomical grounds, the probability of another and more advanced race having existed in the western country previous to those who were found there at the time it was discovered and explored by the Europeans.

Leaving out of view the less important articles on scientific subjects which were presented here and elsewhere, I will only call attention to his most considerable scientific labor, viz: the investigation of the remains of the *Mastodon giganteus* of North America. This gives us the best evidence we could wish of his characteristic enterprise, and of the persistency with which he pursued his object.

In the summer of 1845, there was exhumed in Newburgh, in the State of New York, the most perfect fossil skeleton of the Mastodon, which has yet been discovered; in fact, none of the skeletons of the gigantic extinct races surpass or even equal it in completeness; that of the Siberian Mammoth, which was taken from the ice and is now preserved at St. Petersburg, that of the Mylodon from South America, now contained in the Hunterian Museum, and that of the Megatherium, a part of which is preserved at Madrid and a part in London, are all less complete; and of the Mastodon skeletons now known to exist, all have more important deficiencies. The Newburgh skeleton was mounted, and publicly exhibited, for a few months, in New York and Boston, and elsewhere, after which it was purchased by Dr. Warren. When it came into his possession, the first duty which seemed to be required, was that of remounting the skeleton in a more correct attitude, and the bones in more natural relations. This task was accomplished in a most admirable manner by our associate, Dr. Shurtleff, and the skeleton now stands a monument to his mechanical ingenuity, and to his skill as an osteologist. In addition to its completeness, this skeleton has the merit of certainty that the bones all belonged to one and the same individual, and is believed to be the largest known representative of this gigantic species.* Its height is eleven feet, and the length of the head and trunk seventeen feet. In length and massiveness it surpasses all other proboscidian pachyderms, though some of the elephants in Asia attain to a greater elevation.

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* That is, the largest skeleton. A larger cranium than that belonging to his specimen, as will be seen, belonged to his collection.

The task which he imposed upon himself after he passed his seventieth year, was the description of this invaluable skeleton. We cannot but admire the decision which he manifested in entering upon such a labor, as well as the zeal and perseverance with which he executed it. In order to make his description as complete as possible, he collected together a vast amount of illustrative material in the form of crania, teeth, bones, &c., and incidentally the remains of many other species of animals, forming one of the most valuable private collections ever brought together in this country. The remains of these gigantic representatives of a former geological age literally filled his house from basement to attic. The bones of Dinotheriums, Zeuglodons, Elephants, and Mastodons, the eggs of extinct gigantic birds, covered every available spot on his tables, and huge slabs impressed with the feet of colossal birds and reptiles from the Connecticut Sandstones rested aslant against the walls. These remains were the first objects on which his eyes rested as he awoke in the morning, and we can easily conceive that they were among the last to flit across his imagination as he retired to rest. At home or abroad, they were uppermost in his thoughts. To procure additional knowledge for their elucidation, he visited personally the more important collections in this country, and even made a voyage across the ocean. He might truly say of his investigations, "Hæc studia senectutem delectant, secundas res ornant, ac solatium præbent; delectant domi, perigrinantur, rusticantur, pernoctant nobiscum."

In 1852, the work on which he had labored so assiduously, forming a large quarto volume, was completed and published. Dr. Warren was a descriptive anatomist; the constitution of his mind made him such, and the constant training in the lecture-room, through a long series of years, confirmed him in these tendencies. We can therefore readily perceive that his primary object would be to make a descriptive anatomy of the skeleton of the Mastodon. Without going into any thing like an analysis of this volume, the general subjects treated of are as follows: —

The *first* part is devoted to a description of each of the individual bones in succession, giving for the first time the entire osteology of this animal, for it will be remembered that all the descriptions previously written were based upon a few individual parts, or very incomplete skeletons.

The *second* part treats of the subject of Odontography; for this he had better materials by far than any of his predecessors. Cuvier, Dr. Hayes, and Prof. Owen had done much to clear up the description of the teeth, and Dr. J. B. S. Jackson had made very important additions to the knowledge of the dentition of these animals, and had demonstrated for the first time that in the lower jaw the whole number of teeth on each side was six, and that there was no vertical successor to the third premolar, as Prof. Owen had shown to be the case in the *M. angustidens* of Europe. With the most ample means at his disposal, he has been able to confirm or confute the views of those who preceded him, and has given the most complete description of the whole series of teeth, above and below, and of their succession, which has yet appeared.

The *third* part contains a description of the Cambridge Mastodon, and comparative measurements and descriptions of that and the skeleton of the Asiatic elephant; from which it appears that all the bones of the latter are less massive, the thorax more flattened, the lower jaw shorter and differing remarkably in its anterior termination, the radius and ulna more crossed, and the hand narrower and more vertical; and that the same holds with regard to the foot. "The skeleton is decidedly lighter, and better calculated for motion than that of the Mastodon, while the latter, especially in its anterior parts, presents an arrangement adapted to sustain a very great weight and move a very heavy mass."

The *fourth* part contains a description of the cranium found in Orange County, New York, under the name of "Shawangunk head," and is the largest Mastodon cranium as yet described.

Fifth. On the vertical section of the cranium.

Sixth. On the distinction into species.

Seventh. Coincident existence of the Mastodon and Elephas primigenius, with an examination of the teeth of the latter.

Eighth. On the food and hair.

Ninth. On the condition of the bones.

Tenth. On the geological situation, and the causes of preservation.

The first edition of this work, prepared for distribution at his own expense, was liberally distributed among public scientific institutions, as well as private individuals, to whom he thought it might be useful. It was soon exhausted, and such was the demand made upon him for other copies, that he prepared a second, with corrections and additions, which was brought to its completion a few months before he died.

A short time before his death, Dr. Warren obtained the animal of the Argonaut in the shell, within which last were also contained the eggs. This interested him very much. Assisted by Dr. Kneeland, a paper had been prepared, comprising nearly all that was known on the subject, including the discussions in regard to the question of parasitism or non-parasitism, and the history of the still more curious and interesting subject of the *Hectocotyle*, or male arm of the Argonaut. This paper it was his intention to have read at the meeting which was held on the night previous to his decease, and this meeting, as will be remembered, he had hoped might be held at his own house, where he had so often offered us its hospitality. He had given the invitation into the hands of the Secretary, when the slight illness, from which he had been for some days suffering, became suddenly more alarming, and terminated his life on May 4, 1856.

Such is an imperfect sketch of the life of our late President,—a life characterized through a long series of years by entire devotion to its duties. Among the prominent traits of his character we find that important element, decision, which may give prominence to a man of even moderate powers, and without which wise men are weak ; and nowhere is its importance more conspicuous than in the practice of medicine and surgery. How often does it happen, that when those to whom the question of life and death is intrusted are wavering, that one decided act encourages every heart and steadies every hand. Naturally of a highly sociable disposition, he entered with vivacity, but temperately, into the pleasures and enjoyments of youth ; in maturer years, when his profession absorbed all his time and energy, he was a man of few words, often stern, requiring strict compliance of those who were subordinate to him, ever intent upon the duty of the day. He influenced most men by the force of his will, but he excited the animosity of others who could not brook control.

In old age, he was affable and courteous, enjoying the pleasures of his family, seeking the society of the young, mingling in the reunions of the old, and laboring with all his remaining strength to promote the cause of science. He always took an active interest in the affairs of the church of which he was a member, and since his death its officers have testified to their gratitude for his many services, and to their respect for his religious character.

His name will have a place in the history of American science, and, with the names of Mott and Physic, will stand foremost in the annals of American surgery, during the first half of the nineteenth century.

A LIST OF DR. WARREN'S SCIENTIFIC WRITINGS.

On the Influence of the Climate of St. Augustine, Florida, in Pulmonary Affections. Boston Medical and Surgical Journal, Vol. III. p. 713.

On American Crania. Ibid., Vol. XVII. p. 249.

An Account of the Siamese Twin Brothers, united together from their birth; with a plate. American Journal of Medical Science, Vol. V. p. 253.

Visit to the Epplesheim Fossils, and the Dinotherium giganteum. Proc. Am. Acad. Arts and Sciences, Vol. II. p. 305.

Description of an Egyptian Mummy; 2 plates. 1821.

A Comparative View of the Sensorial and Nervous Systems in Men and Animals; 8 plates. 1822.

The Mastodon giganteus of North America. Quarto. 27 plates. 1852.

The Mastodon giganteus of North America. 4to. 2d edition. 30 plates. 1856.

Address to the Boston Society of Natural History. 1853.

Remarks on the Fossil Impressions in the Sandstone Rocks of the Connecticut River. 3 plates. 1854.

In Volumes II. III. IV. of the Proceedings of the Boston Society of Natural History, are reports of numerous communications, some verbal, and others written. The following are the more important subjects treated of: —

On the Mastodon giganteus, its Teeth, Geological Position, and the number of Species.

On the Dinornis, Zeuglodon, the American Manatee, the Plesiosaurus dolichodeirus; on the Introduction of Foreign Fishes into our waters; on Footprints; on the Felis smilodon, on Peruvian Skulls, on the Sivalik Fossils, (a donation from the Hon. East India Company.)

Besides the above, which relate more especially to subjects connected with natural history, Dr. Warren was the author of a series of much more numerous communications on medical subjects, published in the New England Medical Journal, The Boston Medical and Surgical Journal, The American Journal of Medical Sciences, The Medical Communications of the Massachusetts Medical Society, and The Medico-Chirurgical Transactions of the Royal Medico-Chirurgical Society of London.*

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* The above list is taken from a complete catalogue of Dr. Warren's writings, prepared with great care by Dr. J. F. W. Lane, of Boston, who was kind enough to place it at my disposal, and to whom I am very much indebted for the assistance it afforded me in the preparation of this notice.

NOTICES OF NEW SPECIES OF CRUSTACEA OF WESTERN NORTH AMERICA; BEING AN ABSTRACT FROM A PAPER TO BE PUBLISHED IN THE JOURNAL OF THE SOCIETY. BY WILLIAM STIMPSON.

Chionœcetes Behringianus. Carapax rugose, with the prominences blunt and wart-like about the middle, but becoming sharper anteriorly and at the sides; the surface somewhat scabrous and pubescent. Channels above the postero-lateral margins broad and nearly smooth. Feet everywhere slightly pubescent; the third articles scabrous above. Those of the first pair muricate along the angles. Abdomen in the male 7-articulate, one third the width of the sternal plastron; basal articles strongly granulated; infero-lateral angles of the penultimate article somewhat produced and tumid. It differs from *C. opilio*, Kr., in the proportionally shorter feet of the male. Dredged off Cape Romanzoff by the North Pacific Expedition.

Loxorynchus, (nov. gen.) Carapax pyriform, pubescent, spinous; stomachal region very full; hepatic regions small but prominent, with a principal spine at the middle. Rostrum bifid, more or less deflexed. Præorbital tooth sufficiently prominent. Orbits interrupted by a deep longitudinal sinus above and below, exposing the eyes; post-orbital spine between these fissures acute; a suborbital spine always present beneath the post-orbital. Basal article of external antennæ almost as broad as long, with a sharp spine at its external apex; — this spine, as well as the movable part of the antenna, is not quite concealed beneath the rostrum, but may be seen from above. Pincers in both male and female with their inner denticulated edges touching each other throughout their length. Feet of the second pair slightly longer than the others. Abdomen of the female seven-articulate.

It differs from *Pisa* in its incomplete orbits, and broader basal article of the external antennæ; from *Chorinus* in the non-concealment of these antennæ; from *Pericera* in its movable eye-peduncles; — and though resembling these genera in general form, it differs from all in the deflection of the rostrum. The greater size of the rostrum, and less exposure of the antennæ, distinguish it from *Perinea*, Dana.

Loxorynchus grandis. Carapax warty, the warts being small and very numerous, blunt on the central portions and spine-like on the sides. Surface between the warts minutely granulated; depressions between the regions filled with short hairs. Feet mostly covered with short pubescence; those of the first pair with the fingers denticulated along the whole extent of their inner surfaces; carpus tuberculous above; third joint with four small spines along the upper margin, the largest at the articulation with the carpus. A single spine near the extremity on the third joint of the second and third pairs of feet, and a tubercle on the fourth joint. Feet of the fourth and fifth pairs smooth. Length of carapax 5.55 inch. The animal appears to have been of a rose-color when alive. Taken on the coast near San Francisco, by Lieut. Trowbridge.

Randallia, (nov. gen. *Leucosiadæ.*) Carapax oval, subglobose, nearly smooth, glabrous, armed with two teeth posteriorly; pterygostomian regions angular. Front narrow, but higher or thicker than in *Persephona*, concave at the middle. Orbits three-notched. Antennary fossæ small, oblique, and very deep. Basal article of internal antennæ somewhat expanded, operculiform, completely closing the aperture of the fossa when the antenna is retracted. Fossæ not immediately bordering on the buccal margin as in *Persephona*, but separated by a considerable space, so that the epistoma presents much greater surface than is usual in the family. External maxillipeds and feet as in *Persephona.*

R. ornata. *Ilia ornata*, Randall, Jour. Acad. Nat. Sci., VIII. 129. *Guaia ornata*, Gibbes, Proc. Am. Assoc. 1850, p. 186.

Hippa analoga. *H. emerita*, De Saussure, Rev. et Mag. Zool., V. 367. *H. talpoides*, Dana, Proc. Phil. Acad., VII. 175. (non Say.) Taken in considerable numbers on the coast of California, by Mr. Samuels. A careful comparison shows constant differences between this species and that of the Eastern coast, which will be fully enumerated in my forthcoming paper in the Journal.

Porcellana rupicola. Moderately depressed, without spines; front triangular, considerably deflected, with a blunt extremity, and a notch or groove at the base separating it from the orbit. Ocular peduncles broad, eyes small. Superior margin of orbit concave. External antennæ one and a half times as long as the carapax, flagella with few setæ, some of which are twice as long as the width of the flagellum. Anterior feet large, broad; margins smooth; carpus conspicuously granulated above, and scabrous on its infero-exterior surface; pincers smooth, with uncinate extremities. Second, third, and fourth pairs of feet with tufts of hairs on the fifth joints and tarsi. Color dark purplish-red. Length of carapax, 0.8 inch. Its affinities are with *P. valida*, *violacea*, and *granulosa*. It is very common among the rocks of the Californian coast.

EUPAGURUS SAMUELIS. Front acute at the middle. Outer antennæ articulated at the extreme antero-exterior corners of the carapax; extremity of terminal article of peduncle reaching much beyond the eyes. Anterior feet differing much in size, the right being much the longer and stouter; carpus and hand granulated; larger hand nearly twice as long as broad; finger less than half as long as the hand, with a slight crest not conspicuously denticulated. Feet of the second and third pairs very slender, somewhat hairy; the right foot of the second pair longer than that of the first. Length, 0.75 inch. Taken at Tomales Bay, by Mr. Samuels.

EUPAGURUS TURGIDUS. Carapax rough, somewhat hairy; front broad, acute at the middle and on each side between the bases of the eye-peduncles and the outer antennæ. Antennæ very hairy, inner ones three fourths as long as the outer ones, which are shorter than the carapax; eyes reaching the extremity of the peduncle of the outer antennæ. Anterior feet equal, much shorter than those of the second pair; covered above with short spines and tufts of long hair; hands short and very thick, strongly tumid below; finger about half as long as the hand. Feet of second and third pairs nearly equal, spinulose and very hairy throughout their length. Tarsi with corneous tips. Length, three inches. Differs from the other Oregon species by the hairiness of its tarsi. Taken in Puget Sound, by Dr. Suckley.

CALLIANASSA LONGIMANA. This species is closely allied to *C. Californiensis*, Dana, but is larger, more slender, the outer maxillipeds less broad, and the greater foot of the anterior pair proportionably much longer, narrower, and less hairy. The carpus is shorter than the body of the hand, while in *C. Californiensis* it is longer. In the smaller hand the finger and thumb are equal in length. In *C. gigas*, the hand is much shorter and stouter than in either of the other species. *C. longimana* is found abundantly in Puget Sound, whence specimens were sent by Dr. Suckley.

Astacus nigrescens. Margins of the rostrum nearly parallel, denticulated with five or six small sharp spines on either side; the two anterior thoracic spines rather long. Dorsal area between the branchial regions as wide as in *A. Gambellii*, from which this species differs in its smaller and more slender hands, which are also without pubescence. The lateral angles of the abdominal segments are sharp, and the caudal segment has two slender spines on each side. Color, blackish. Length, three inches. It is common in the vicinity of San Francisco.

Astacus Trowbridgii. A large species having a general resemblance to *A. leniusculus*, Dana, from which it differs in its much less prominent thoracic spines, the posterior pair of which are here scarce perceptible. Rostrum broad, with smooth, nearly parallel sides; terminal spine rather short. Hands large and broad, of a reddish olive color, darker than that of the body. Length, five inches. Found in the Columbia River, above Astoria, by Lieut. Trowbridge.

Astacus Klamathensis. Thorax smooth above, rather contracted in front. Rostrum subtriangular, but with the lateral teeth sufficiently distinct, sides smooth, converging. Posterior pair of thoracic spines obsolete. Hands small; dentation of inferior edge of arm slight. Lateral margins of abdominal segments broadly rounded, scarcely at all angular. Color, bright yellowish white; hands tinted with bluish. Length, three inches. Found in Klamath Lake, by Dr. Newberry.

Pandalus Danæ. Thorax glabrous. Twelve spines on the dorsal crest and rostrum, the posterior one being at about the middle of the carapax. Rostrum smooth above toward the trifid apex, and six-toothed below, the basal tooth large and much curved. Feet spinulose; the spinules on the third joint few and distant. Length, 2.5 inches. Dredged in Puget Sound, by Capt. Murden.

IDOTÆA RESECATA. Slender, convex above, thorax concave below. Greatest breadth at the sixth thoracic segment. Outer antennæ reaching the fourth thoracic segment; peduncle rather stout; flagellum 17-articulate. Basal article of inner antennæ suborbicular, much expanded. Abdomen subrectangular, nearly twice as long as broad; posterior extremity with a deep concavity, terminating on either side in a sharp angular projection or spine. The first and second segments of abdomen sufficiently well marked, the third also distinct on the sides;—the three occupying the anterior third of the length of the abdomen. Color greenish yellow, with a median line of dark red. Length, 1.7 in.; breadth, 0.33 in. It resembles *I. hectica* in general appearance. Dredged in Puget Sound, by Capt. Murden.

LYGIA DILATATA. Body variable in its proportions, but usually very broad; the breadth to length being often as 1 : 1.5. Surface granulated. Margins smooth, raised or thickened. Head with a transverse ridge between the eyes, interrupted at the middle. External antennæ reaching the sixth segment; flagellum with 14 oblong articles. Caudal appendages very short, about one fifth the length of the body; basal article as broad as long. Color, blackish. Length, 1½ inch. Found at Fort Steilacoom, Puget Sound, by Dr. Suckley.

LIVONECA VULGARIS. Variable in shape, often distorted; frequently abruptly widened at the fifth thoracic segment. Head small, wider than long; inner antennæ somewhat shorter and stouter than the outer or posterior ones. Epimeral pieces narrow, separated from the tergal piece anteriorly by a distinct suture, posteriorly by a deep incision; the point reaching the margin of the tergum in the anterior four segments, and not extending much beyond it in the posterior three. Posterior thoracic segment deeply sinuated for the reception of the middle portion of the anterior abdominal segments. Lamelliform caudal segment always transverse in the adult. Color, yellowish-gray; posterior pair of false feet always black. Length, 1.5; breadth, 0.9 inch. Very common on fish in the San Francisco market.

SPHŒROMA AMPLICAUDA. Caudal segment and posterior pair of false feet greatly expanded. Thorax with three longitudinal rows of small tubercles, those of the middle row becoming gradually larger posteriorly, the terminal one subspiniform, pointing backward. Abdominal plate large, forming two fifths the length of the body, triangular, terminating in an acute point. Outer lamellæ of posterior false feet very large, dilated, but not extending posteriorly beyond the extremity of the abdomen. Length, 0.25; breadth, posteriorly, 0.17 inch. Found at Tomales Bay, by Mr. Samuels.

The President called the attention of the Society to the very valuable collection of books on Natural History, from the library of the late Dr. Amos Binney, deposited with the Society for their use by Mrs. Binney, and now for the first time placed upon the shelves in the Society's rooms, as follows:—

Since the first organization of our Society, a quarter of a century, with all its varied changes, has been completed; and it is a melancholy thought, which forces itself upon me, that of those assembled here to-night, or of those who now usually meet with us, there are found so few who aided and supported it in its infancy. Some, yielding to the exacting duties of life, have withdrawn from us wholly, or in part, their active coöperation, though we trust, not their sympathy or good wishes. Others have passed away, to be with us here no more forever; among these were some of our most active associates, some of our most disinterested friends. We hold in grateful remembrance the names of Greenwood, Gay, Greene, Teschemacher, Harris, Burnet, Warren. Each in his own way contributed to our progress, and is associated with our history.

But there was one to whose thoughts our Society and its concerns were always a welcome subject,—one who laboriously coöperated with others in its organization, who, more than any other, modelled its plan of action, and whose wisdom and forethought still guides us. Around the collection made and presented by him has grown up our whole cabinet. The first paper printed in the pages of our Journal was contributed by him, and for the period of seventeen years, from the first organization of the Society till his death, he was one of its most efficient officers. He was called to preside over its councils, and in every way in his power contributed to its growth and progress. Some of us remember with gratitude, how unselfishly, and with how much pleasure he encouraged the student of nature, and how generously he opened his resources for study to all. He loved and studied nature himself, and rejoiced in every well-meant endeavor to advance, and in every step made in the progress of natural science. His name I need not mention, it is already in your thoughts, and has been suggested to you by the treasures of knowledge now opened out before us, the treasures which his bounty enabled him to accumulate, and which he desired might be useful to others as well as himself. These he had profoundly studied, and in accordance with his munificent wish, they are now committed to our keeping as a living fountain from which the student of nature is invited to draw.

It has been truthfully said of him, by one of our number, and no one could better appreciate his motives of action, "that he loved the works of nature, not as objects of scientific interest only, but as beautiful manifestations of divine wisdom, adapted at the same time to afford the well-disposed mind, gratification of the purest and deepest kind. As a lover of nature, he viewed with delight the whole landscape; as a naturalist, he loved to study the relations of individual parts." "And when with his generation, his memory as a man, an enterprising citizen, a father, and a friend shall have passed away, his name must ever appear among the pioneers of science in America as one of its most substantial supporters, and as having contributed materially to the enlargement of its boundaries." *

On motion of Mr. James M. Barnard, it was

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* Dr. A. A. Gould; from the memoir prefixed to the work on the Terrestrial and Air-Breathing Mollusks of the United States, by Amos Binney, M. D. 2 vols. 8vo.

Voted, That Dr. Wyman be requested to furnish a copy of his noble tribute to the memory of the late Dr. Warren, for publication and general distribution, in such manner as the Council should decide.

Dr. J. B. S. Jackson exhibited a remarkably tattooed skin, taken from the body of a man supposed to be a South Sea Islander. The coloring matter had been examined by Dr. Bacon, and found to be carbon. The same substance was seen in the inguinal glands.

Dr. Pickering remarked that the natives of the Navigator and Tonga Islands tattoo themselves in the same manner; and possibly the man from whom the specimen was taken may have belonged to one of those islands.

Dr. C. T. Jackson presented a collection of mineral concretions, composed of hydrated black-oxide of manganese imbedding sand, in the form of globular or nearly globular balls. The specimens were sent by William Haley, Esq., of Tuftonboro, N. H.

Dr. Jackson made some observations upon the formation of such concretions, as illustrating the manner in which many of the ancient and fossil concretions may have been produced.

The remarks of Dr. Jackson elicited a discussion upon the geology of the locality at Scarboro, Maine, and upon the explanation of the formation of the concretions found at that place, which was participated in by Dr. Gould and Messrs. Bouvé and Sprague.

A letter was read from Mr. William Stimpson, suggesting to the Society the propriety of memorializing Congress upon the publication of a report, upon those results of the recent North Pacific Expedition, which appertain to Natural History. A committee was appointed for this purpose, consisting of the President, and Messrs. Abbot, Gould, and Whittemore.

The Corresponding Secretary announced the reception of the following letters, viz: —

From Die K. Preussische Akademie der Wissenschaften, March 20th; Zoölogisch-Botanischer Verein, Vienna, May 10th; Kaiserliche Akademie der Wissenschaften, Vienna, May 25th; the same, July 16th; Dublin University Zoölogical and Botanical Association, November 28th, presenting their various publications; Société de Physique et d'Histoire Naturelle de Genéve, March 11th, acknowledging the receipt of the Journal and Proceedings of the Society, and presenting its own publications; Kaiserliche Akademie der Wissenschaften, April 15th, and the Trustees of the New York State Library, Nov. 21st, acknowledging the receipt of the publications of the Society; Dr. Charles Martin, U. S. N., Nov. 22d, in acknowledgment of a letter from the Secretary; Winthrop Sargent, Philadelphia, Nov. 18th, in acknowledgment of his election as Corresponding Member; Dr. Lewis R. Gibbes, Charleston, Nov. 15th, asking for missing numbers of Proceedings, &c.; Stephen Calonby, New York, Nov. 25th, the same; George N. Lawrence, New York, Dec. 10th, in acknowledgment of his election as Corresponding Member; William Stimpson, Washington, Dec. 11th, concerning the publication of the results of his labors on the Behring's Straits Expedition; Robert Clarke, Cincinnati, Oct. 29th, asking for missing numbers of the Proceedings.

Captain N. E. Atwood was elected Curator of Ichthyology.

DONATIONS TO THE MUSEUM.

Oct. 1st. A very valuable collection of Fossil Bones from the Brazos River, Texas, belonging to Mastodon, Elephant, and Megatherium; by Dr. Charles Martin, Surgeon, U. S. Navy. Specimens of Tubipora, and Coral, and the Cranium of an Albatross; by Capt. George E. Tyler, of Dorchester. Two eggs of the Pileated Woodpecker, *Dryocopus pileatus* (rare specimens); by Dr. Cornelius Kollock, of Cheraw, S. C. A Fish and the Saws of two species of Pristis; by Dr. S. Durkee.

Oct. 15th. A collection of Insects from Chili; by C. W. Blake, Esq. A specimen of Salamandra salmonea; by Dr. J. N. Borland. Copper and Silver Ores, from Lake Superior; by Dr. S. Kneeland, Jr.

Nov. 5th. A specimen of Amaranthus pumilus, from Sachuest Beach, Newport, R. I.; by Dr. Charles Pickering. European Nightingale, *Philomela luscinia;* by Dr. J. N. Borland. A piece of live oak, taken in the year 1844 from the wreck of the British Frigate Merlin, which was sunk in the River Delaware in 1777; by R. G. Parker, Esq.

Nov. 19th. Nest and eggs of Anna Humming-bird; five eggs of California Quail; two of *Chordestes grammaca;* four of *Quiscalus Mexicanus;* two of *Hirundo bicolor;* one of *Hirundo lunifrons;* one of *Garrulus Californianus;* three of *Sturnella neglecta;* one of *Muscicapa verticalis;* five of *Agelaius gubernator;* one of *Melanerpes formicivorus;* two of *Ectopistes marginellus;* one of *Buteo calurus;* one of *Buteo montanus;* one of *Buteo insignatus;* collected in California, by Mr. E. Samuels.

Dec. 3d. A Fish, probably an undescribed species, belonging to the family with Scopelus, taken off the eastern coast of Newfoundland, and a fœtal Porpoise; by Capt. N. E. Atwood. Specimens of *Helix minutissima*, Lea, from Portland, Me.; by E. S. Morse, Esq., of Portland. A Fossil Shell, *Spirifer Niagarensis?* from Delaware, Canada West; by Capt. N. E. Atwood. Mineral concretions, from Tuftonboro', N. H., said by Dr. C. T. Jackson to be composed of black oxide of manganese imbedding sand, in the form of globular, or nearly globular balls; by Wm. Haley, Esq., of Tuftonboro, N. H. Prairie Dog, *Arctomys Ludovicianus*, Ord., from Nebraska; by Dr. F. V. Hayden. *Mus Michiganiensis*, old and young, and *Sciurus magnicaudatus* or *rubricaudatus*, (Fox Squirrel,) from Illinois; by Robert Kennicott, Esq.

Dec. 17th. A Fossil Tooth of a Moose, from Gratiot Lake, near Lake Superior; by O. A. Farwell, Esq. Skull of Musquash, *Fiber Zibethicus*, Cuv., with one of the upper incisor teeth elongated and coiled in a spiral form; by Mr. Fletcher. A globular concretion of grass, said to have been formed by the action of waves upon the sea-shore; by Dr. H. R. Storer.

BOOKS RECEIVED DURING THE QUARTER ENDING DEC. 31, 1856.

Smithsonian Contributions to Knowledge. Vol. VIII. 4to. Washington, 1856. *From the Smithsonian Institution.*

American Geological History. James D. Dana. 8vo. Pamph. New Haven, 1856. *From the Author.*

Ecole Polytechnique. Cours de Géologie Paleontologique. Jules Marcou. 8vo. Pamph. Zurich, 1856. *From the Author.*

Inauguration of the Dudley Observatory at Albany, Aug. 28, 1856. 8vo. Pamph. *From J. H. Hickcox.*

Denkrede auf Johann Nepomuk von Fuchs. F. von Robell. 4to. Pamph. München, 1856. *From the Author.*

Beitrag zur Kenntniss der Ostracoden. Dr. S. Fischer. 4to. Pamph. München, 1855. *From the Author.*

Ueber die nächste Ursache der Spontanen Bläuung einiger Pilze. C. F. Schoenbein. 4to. Pamph. München, 1856. *From the Author.*

Thirty-sixth Report of the Leeds Literary and Philosophical Society. 8vo. Pamph. Leeds, 1855–6. *From the Society.*

Report of the Proceedings of the Geological and Polytechnic Society of West Riding, Yorkshire. 8vo. Pamph. 1855. Leeds. *From H. Denny, A. L. S.*

Report on the Minerals and Mineral Waters of Chili. J. L. Smith. 4to. Pamph. Louisville. *From the Author.*

Revision of the Synonymy of the Testaceous Mollusks of New England. Wm. Stimpson. 8vo. Pamph. Boston, 1851.

Description of New Marine Invertebrata. By the same. 8vo. Pamph. Philadelphia, 1855. *From the Author.*

Affinities of the large Extinct Bird, Gastornis Pariensis, Hebert. Prof. Richard Owen. 8vo. Pamph. London, 1856.

Description of some Mammalian Fossils from the Red Crag of Suffolk. By the same. 8vo. Pamph. London, 1856. *From the Author.*

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Latham's General Synopsis of Birds. 10 vols. 4to. Full Russia, gilt edges. London, 1781–1801.
Latreille's Histoire Naturelle des Reptiles. 4 vols. in 2. 24mo. Half sheep. Paris, 1830.
Leach's Crustacea. 4to. Half calf. London, 1817.
Lesser's Insecto-Theology. 8vo. Sheep. Edinburgh, 1799.
Lesson, Manuel d'Ornithologie. 2 vols. 24mo. Paris, 1828.

Lewin's Birds of Great Britain. 8 vols. in 4. Royal 4to. Full green mor. London, 1795–1800.

Lewin's Lepidopterous Insects of New South Wales. 4to. Half mor. London, 1822.

Lister's Exercitatio Anatomica. 8vo. Old calf. London, 1694.

Low's Funda Oreadensis. 4to. Half calf. Edinburgh, 1813.

Lyonnet, Recherches sur les Insectes. 4to. Half calf. Paris, 1832.

Laccpede, Histoire Naturelle. 5 vols. 8vo. Half calf. Paris, 1819.

Latreille, Cours d'Entomologie. 8vo. Half calf. Paris, 1831.

" Familles Naturelles du Regne Animal. 8vo. Half calf. Paris, 1825.

Leach and Nodder's Zoölogical Miscellany. 3 vols. Royal 8vo. Half calf. London, 1814–17.

Lemprière's Lectures on Natural History. 8vo. Boards. London, 1830.

Lesson, Manuel de Mammalogie. 24mo. Half calf. Paris, 1827.

Le Vaillant, Voyage dans l'Afrique. 2 vols. Sheep. Paris, 1790.

Le Vaillant, Deuxième Voyage dans l'Interieur de l'Afrique. 3 vols. 8vo. Sheep. Paris.

Lewin's Birds of New Holland. Royal 4to. Half mor. London, 1838.

Lewis and Clarke's Expedition. 2 vols. 8vo. Sheep. Philadelphia, 1814.

Lubbock's Fauna of Norfolk. 8vo. Cloth. Norwich, 1845.

Loudon's Magazine of Natural History. 1st and 2d series. 13 vols. 8vo. Half Russia. London, 1829–40.

Marsham's Entomologia Britannica. 8vo. Half calf. London, 1802.

Martyn's Dictionary of Natural History. 2 vols. in 1. Folio. London, 1785.

Memoires de la Société d'Histoire Naturelle de Paris. 5 vols. 4to. Half calf. Paris, 1823–24.

Memoires de la Société d'Histoire Naturelle de Strasbourg. 2 vols. (and Vol. III. in paper, and 3 nos. 4to. Half calf. Paris, 1830–35.

Memoires de la Société de Physique et d'Histoire Naturelle de Genève et Paris, 1821–42.

Memoires de la Société de Physique et d'Histoire Naturelle de Genève et Paris. Vols. X. and XI. Paper.

Memoir of Lewis David von Schweinitz, P. D. 12mo. Pamph. Philadelphia, 1835.

Michaux, Histoire des Arbres Forestiers de l'Amerique Septentrionale. 3 vols. Royal 8vo. Full Russia. Paris, 1800–13.

Montagu's Ornithological Dictionary. By Rennie. 8vo. Half calf. London, 1831.

Mudie's British Birds. 2 vols. 8vo. Cloth. London, 1834.

Miscellany of Natural History. Parrots. 12mo. Cloth. Edinburgh, 1833.

Molina, Histoire Naturelle du Chili. 12mo. Sheep. Paris, 1789.

Museum Wormianum. Folio. Full calf. Amsterdam, 1655.

Magazine of Zoölogy and Botany. Conducted by Jardine, Selby, and Dr. Johnston. 2 vols. 8vo. Cloth. Edinburgh, 1837–38.

Magendie, Anatomie des Systêmes Nerveuses. 2 vols. Half bound. Paris, 1825.

Magendie, Precis de Physiologie. 2 vols. 8vo. Boards. Paris, 1825.

Mantell's Medals of Creation. 2 vols. Post 8vo. Cloth. London, 1844.

" Wonders of Geology. 2 vols. Post 8vo. London, 1838.

Meckel, Anatomie Comparée. 6 vols. 8vo. Half sheep. Paris, 1828–30.

Mammatt's Geological Facts. Royal 4to. Cloth. London, 1836.

Marsham's Coleoptera Britannica. 2 vols. Half mor. London.

Minstrelsy of the Woods. 12mo. Cloth. London, 1832.

Moufeti Insectorum sive Minimorum Animalium Theatrum. Small folio. Half calf. London, 1634.

Monograph of Testudinata. By Thomas Bell. Folio. Paper. London.

Müller, Zoölogica Danica. 2 vols. Folio. Boards. Havaniæ, 1788–89.

Natural History. Birds. 12mo. Cloth. London, 1835.

Natural History. Insects. (Family Library.) 2 vols. 12mo. Boards. New York, 1830.

Natural History of Norway. Folio. Half Russia. London, 1845.

Natural and Civil History of America. 2 vols. in 1. Folio. Calf. London, 1760.

Nature Displayed. Translated from the French. 7 vols. 12mo. Full calf. London, 1733.

Naturalists' Miscellany. 19 vols. 8vo. Full calf.

Neue Wirbelthiere von Dr. Ruppell. 2 vols. Folio. Paper covers. Frankfort, 1836–40.

Nuttall's Travels in Arkansas. 8vo. Boards. Philadelphia, 1821.

Oliver's Recollections of Fly Fishing. 16mo. Cloth. London, 1834.

Owen's History of British Fossil Mammalia and Birds. 10 nos. 8vo. London, 1844–46.

Owen's History of Serpents. 4to. Full calf. London, 1742.

Owen's Description of the Skeleton of an Extinct Gigantic Sloth. 4to. Cloth. London, 1842.

Parra, Descripcion de Historia Naturale mas del ramo Maritimo. Small 4to. Old calf. Havana, 1787.

Pallas, Miscellanea Zoölogica. 4to. Half calf.

Parkinson's Organic Remains. 3 vols. 4to. Half calf. London, 1808–20.

Parkinson's Outlines of Oryctology. 8vo. Half calf. London, 1822.

Patterson's Insects mentioned in Shakespeare's Plays. 12mo. Cloth. London, 1838.

Pennant's Arctic Zoölogy. 3 vols. 4to. Old calf. London, 1792.

Pennant's Indian Zoölogy. 4to. Half calf. 16 colored plates. London, 1790.

Pennant's British Zoölogy. Imp. folio. Full Russia. 107 plates. London, 1766.

Pennant's British Zoölogy. 4 vols. Royal 8vo. Half calf. London, 1812.

Pennant's Genera of Birds. 4to. Half calf. London, 1781.

Pennant's History of Quadrupeds. 2 vols. 4to. Half calf. London, 1793.

Péron, Voyage aux Terres Australes. 2 vols. 4to. Atlas. Folio. Half calf. Paris, 1807–16.

Percheron, Bibliographie Entomologique. 2 vols. 8vo. Half calf. Paris, 1837.

Phillips's Mineralogy. 8vo. Boards. New York, 1818.

Pisonis Indiæ utriusque de re Naturali et Medica. Folio. Parchment. Amsterdam, 1658.

Plinii Historia Naturalis. Folio. Old calf. 1615.

Pline, Histoire Naturelle. 12 vols. 4to. Sheep. Paris, 1771–82.

Programme de l'Imperiale Sociétè des Naturalistes. 4to. Pamph. Moscow, 1825.

Polehampton's Gallery of Nature and Art. 6 vols. 8vo. Full calf. London, 1817.

Pulteney's Writings of Linnæus. 4to. Sheep. London, 1833.

Rennie's Conspectus of Butterflies and Moths. 18mo. Boards. London, 1832.

" Field Naturalists' Magazine, from January, 1833, to April, 1834. 8vo. Half calf. London.

Redi Opuscula Varia Physiologica. 3 vols. 24mo. Parchment. London, 1729.

Report of Geological Reconnaissance of Virginia. By W. B. Rogers. 4to. Without covers.

Rogers's Geology of New Jersey. 8vo. Cloth. Philadelphia, 1840.

Richardson, Fauna Boreali-Americana. 4 vols. 4to. Half mor. London, 1829–37.

Ross's Appendix to the Narrative of a Second Voyage in Search of a Northwest Passage. Royal 4to. Cloth. London, 1835.

Rusconi, Monografia del Proteo Anguino de Laurenti. 4to. Full calf. Pavia, 1819.

Ruppell, Zoölogische Atlas von Nord Afrika. Royal 4to. Half red mor. Frankfort à Main, 1826.

Russell on Indian Serpents. Imp. folio. Full green mor. London, 1796.

Rutherforth's (Thomas) Ordo Institutionum Physicorum. Cambridge, 1743.

Reaumur, Histoire des Insectes. 6 vols. 4to. Old calf. Paris, 1734–42.

Salmonia. 12mo. Boards. Plates. London, 1832.

Samoulle's Entomologist's Compendium. 8vo. Half calf. London, 1819.

Saint-Hilaire, Histoire Naturelle des Mammiferes. 8vo. Half calf. Paris, 1829.

" Zoölogie Generale. 8vo. Half calf. Paris, 1841.

Salvianus Aquatilium Historiæ. Folio. Parchment. Rome, 1554.

Scheuchzer's Histoire Naturelle de la Bible. 8 vols. in 5. Folio. Full Russia. Amsterdam, 1732–37.

Schlegel, Essai sur la Physionomie des Serpens. 2 vols. 8vo. Sheep. And Atlas. Haye, 1837.

Schoolcraft's View of Mines and Minerals of Western United States. 8vo. Boards. New York, 1819.

Seba Albertus, Locupletissimi Rerum Naturalium Thesauri. 3 vols. Large folio. Full sheep. Amsterdam, 1758.

Sepp, Nederlandsche Vogelen. Imp. folio. Half calf. Amsterdam, 1770.

Selby's British Ornithology. 2 vols. 8vo. Half mor. Edinburgh, 1833.

Shaw, George, General Zoölogy. Vol. III. 2 parts. 8vo. Boards. London, 1802.

" " Zoölogical Lectures. 2 vols. 8vo. Half calf (and duplicate, half bound.) London, 1809.

Shepard's Mineralogy. 12mo. Cloth. New Haven, 1844.

Shepard's Report of the Geological Survey of Connecticut. 8vo. 188 pp. New Haven, 1837.

Shepard's Syllabus to Lectures on Chemistry. 8vo. 204 pp. Charleston, 1841.

Smellie's Philosophy of Natural History. 4to. Half calf. Edinburgh, 1790.

Another copy. 8vo. Dover, 1808.

Smith's Botany. Boston, 1814.

Smith's (J. E.) Memoirs and Correspondence. Edited by Lady Smith. 2 vols. 8vo. Boards. London, 1832.

Smith (J. E.) on the Sexes of Plants. 8vo. Half calf. London, 1786.

Smith's (J. E.) Selection of the Correspondence of Linnæus, &c. 2 vols. 8vo. Boards. London, 1821.

Smith's Tracts on Natural History. 8vo. Old calf. London, 1798.

Smith's (S. S.) Essay on the Human Species. 8vo. Sheep. New Brunswick, 1810.

Smith's (J. V. C.) Fishes of Massachusetts. 12mo. Boards. Boston, 1833.

Soemmerring (Thomas von) on the Elephant, Mastodon, &c.

Specimen Archæologiæ Telluris. 4to. Pamph. Göttingen, 1803.

Specimen Lithographiæ Helveticæ. Old calf. 24mo. Liguri, 1602.

Spallanzani's Natural History of Animals and Vegetables. 2 vols. 8vo. Sheep. London, 1784.

Spallanzani's Travels in the Two Sicilies. 4 vols. 8vo. Calf. London, 1798.

Stark's Natural History. 2 vols. 8vo. Half calf. Edinburgh, 1828.

Stillingfleet's Tracts relating to Natural History, &c. 8vo. Sheep. London, 1791.

Storer's Fishes and Reptiles of Massachusetts. 8vo. Half calf.

Storer's Synopsis of Fishes of North America. 4to. Boards. Cambridge, 1846.

Swainson's Birds of Brazil and Mexico. 8vo. Half mor. gilt. London, 1841.

Swammerdam's History of Insects. Folio. Old calf. London, 1758.

Système Naturelle du Regne Animal. 2 vols. 8vo. Calf. Paris, 1754.

Schaeffer's Elementa Entomologica. 4to. Ratisbon, 1755.

Taylor's Report on the Washington Silver Mine. 8vo. 40 pp. Plates. Philadelphia, 1845.

Temminck, Manuel d'Ornithologie. 4 vols. 8vo. Half calf. Paris, 1820–40.

Thacher's American Medical Biography. 8vo. Boards. London, 1827.

Thompson's Zoölogical Researches. 4 nos. 8vo. Pamph. Cork.

Timb's Knowledge for the People. 5 nos. 24mo. Boston, 1831–32.

Transactions of the Natural History Society of Northumberland, Durham, and Newcastle-upon-Tyne. 2 vols. 4to. Half mor. Newcastle, 1831–1838.

Transactions of the Geological Society of Pennsylvania. Vol. I. 8vo. Cloth. Philadelphia, 1835.

Transactions of the Literary and Philosophical Society of New York. Vol. I. 4to. Boards. New York, 1815.

Temminck, Monographies de Mammalogie. Tome I. 4to. Old calf. Paris, 1827.

Tudor's Letters on the Eastern States. 8vo. Boards. Boston, 1821.

Vasari, Le Vite dei Pittori. 4to. Parchment. Fiorenza, 1568.

Virey, Philosophie de l'Histoire Naturelle. 8vo. Half calf. Paris, 1835.

Voyage dans le Nord d'Hayti. 4to. Paper. (Imperfect.)

Wallis on the True Age of the World. 8vo. Cloth. London, 1844.

Wallace's Dissertation on the Number of Mankind. 12mo. Calf. Edinburgh, 1753.

Wells on Dew. 8vo. Boards. London, 1815.

Wernerian Natural History Society Memoirs. 7 vols. 8vo. Half calf. Edinburgh, 1811–38.

White's Journal of a Voyage to New South Wales. Royal 4to. Full calf. 65 plates. London, 1790.

Whitehurst's Works. 4to. Old calf. London, 1792.

Wiegmann, Archiv fur Natürgeschichte. 9 vols. Half calf. 2 vols. in nos., in all 11 vols. 8vo. Berlin, 1835–45.

Willoughbeii Ornithologia. Folio. Old calf. London, 1676.

Wilson's American Ornithology. 3 vols. 8vo. Half mor., uncut. New York and Philadelphia, 1828.

Wilson's American Ornithology. 9 vols. 4to. Half bound. Philadelphia, 1812.

Wilson's American Ornithology. Royal 4to. Half mor. New York, 1829.

Wilson on Insects. 4to. Boards. Edinburgh, 1835.

Wilson's Natural History of Fishes. 4to. Boards. Edinburgh, 1838.

Wilson's Natural History of Quadrupeds and Whales. 4to. Boards. Edinburgh, 1838.

Witham's Observations on Fossil Vegetables. Thin 4to. Boards. Edinburgh, 1838.

Wood's Ornithological Guide. 8vo. Cloth. London, 1835.

Wiegmann, Herpetologia Americana, fol. Berolini. 1834.

Wood's Catalogue of the Best Works on Natural History. 8vo. London, 1832.

Webster's History of St. Michaels. 8vo. 1821.

Yarrell's British Fishes. 2 vols. 8vo. Half calf. London, 1836.
" British Fishes. Supplement. 8vo. Cloth. London, 1839.
" British Birds. 3 vols. 8vo. Half calf. London, 1843.

Zimmermann, Specimen Quadrupedum. 4to. Sheep. London, 1777.

Zoölogical Journal. 6 vols. 8vo. (1 of plates,) Half Russia, London, 1825–29.—*Deposited by Mrs. Amos Binney.*

January 7, 1857.

The President in the Chair.

Mr. James E. Mills exhibited specimens of slate from Somerville, Massachusetts, and read the accompanying account of an analysis made by Mr. L. M. Dornbach, of the Lawrence Scientific School.

The following analysis of a variety of Slate, found in the town of Somerville, Mass., near Boston, was commenced upon the supposition that it was a Dolomite; as the cleavage resembled, in many respects, that of rhombohedral carbonates.

The angle which the plane in the direction of the dip makes with the plane of stratification is 102.° The angle which the other plane of cleavage makes with that of stratification is 112°.

The angle which the two planes inclined to the plane of stratification make with each other is 110°, though this varies somewhat in different specimens. The specific gravity is the same as that of Dolomite, being 2.8192.

Analysis shows it to be a silicate of iron, alumina, lime, and magnesia, in which the lime forms less than one per cent. of the whole, as is shown by the following table: —

Water	3.439
Sesquioxide of Iron	8.324
Sesquioxide of Alumina	19.353
Lime	.625
Magnesia	4.944
Silica	63.238
	99.923

The President exhibited the dilated vena cava of an Otter, (*Lutra Canadensis,*) recently taken in Massachusetts, and explained the peculiar physiological condition of this animal in connection with its diving habits. He also pointed out some other interesting points in its anatomy.

Prof. H. D. Rogers made some remarks upon American and European Geology, in anticipation of a paper which he said he intended to bring before the Society.

Dr. T. M. Brewer read the following paper on Vireosylvia: —

In the Proceedings of the Academy of Natural Sciences of Philadelphia, (Vol. V. p. 153,) a description of a new species of

Vireosylvia is given by Mr. John Cassin of Philadelphia, from a single specimen obtained by him in Brigham's Woods, near that city. Its close resemblance to *V. gilva*, and the fact of its having been for some time an unique specimen, has led to the doubt whether it was a good species. Mr. Cassin described it as differing from the *gilva*, which it most resembled, in being smaller, in having a shorter and weaker bill, and a form generally shorter and stouter, with colors more vivid, and the superciliary line more distinct. He named it *Vireosylvia Philadelphica.*

Two years since, my attention was called by Thure Kumlien, Esq., a very accurate and careful ornithologist of Wisconsin, to a specimen of Vireosylvia obtained by him near Lake Koskouong, in the southwestern part of that State. He thought it a distinct species from any he had seen any description of, and quite distinct from the *V. gilva.* I gave the specimen to a friend, upon whose judgment I relied more than I could upon my own, who pronounced it a *V. gilva.* Mr. Kumlien was not satisfied with this decision, and still insisted that its habits, even more than its plumage and size, showed it to be a distinct species. The following year he sent me several specimens which I gave to Mr. Cassin, who had no doubt that they were of the species he had described as *V. Philadelphica*, though others to whom I showed them were still unconvinced. In answer to a letter in which I informed Mr. Kumlien that his birds were supposed to be the *V. gilva* in an unusually fresh plumage, he wrote me the answer which I give below. It proves, to my mind, conclusively his correctness, establishing the species to be a good one, distinct from *V. gilva* and identical with that described by Mr. Cassin as *V. Philadelphica.* I take the greatest pleasure in thus giving Mr. Kumlien the credit of having worked it out, unaided by any suggestion or help from any one, in view of the disadvantages under which he labors in the want of access to any text-books. His letter is interesting, as throwing the first light that has yet been given to the public upon the habits and distribution of this new and little known species. The following is the extract referred to: —

"In regard to the Vireo which I sent you last being the *Vireo gilvus* 'in an unusually fresh plumage,' I beg your perusal of the following remarks. You may think it bold in me, but so far as I read Wilson I am not satisfied in regard to this vireo matter.

"*Vireo gilvus*, Wilson — in every respect agreeing with Wilson's description — is common here from the 8th or 10th of May till September. It consequently breeds here. It is an excellent singer. I have a number of skins, and all agree in their markings. There is very little difference between its spring and autumnal dress. It is found in openings more than in thick timber, and frequently near farm-houses. Its length varies from 5½ to 6 inches; I have one that measures full six. *Vireo* —— ? — that which I sent you, and which cannot be *V. gilvus* if the preceding is — is by no means so common as the other, and I have never observed it before May 15th, and only from the 15th to the 25th of May and in September. I never heard this bird sing a note. It keeps in the most secluded thickets; I never found it anywhere else. It is a smaller bird than the other. Its length is from 5 to 5¼ inches, which is the longest I have ever found. I admit that in general markings both birds are very much alike, but the *gilvus* is a more slender bird than the other, which appears stouter. Between the spring and autumnal dress of the *gilvus*, as I have said, there is but little difference in the markings, but the other, in autumn, is considerably tinged with yellow. Another point is the difference in the relative length of the primaries, which is as follows: —

V. gilvus.	*Vireo* —— ?
First primary very short.	First primary longer than 5th.
Second do. longer than 6th.	Second do. longest and of
Third do. longest and of	Third do. the same length.
Fourth do. the same length.	Fourth do. longer than the 1st.
Fifth do. longer than 2d.	Fifth do. shortest.
Wing 3 inches.	Wing 2½ inches.

"This will, I think, separate them. This measurement was taken from several specimens.

"But the question may arise, is not my *V. gilvus* perhaps the *V. Noveboracensis*? It is not; the iris is hazel and not white, and moreover, on my *gilvus* there are no yellow markings, except a very faint greenish-yellow on the breast. *V. Noveboracensis* is

5¼ inches in length, and I never had a specimen of *V. gilvus* so small as that."

I have given Mr. Kumlien's letter in nearly his own language, and in no instance have I varied from his meaning. I think it establishes his vireo to be a good species, and if so, it is the *Vireosylvia Philadelphica* of Mr. Cassin.

President Hitchcock exhibited specimens of impressions, which he supposed to be those of a Myriapod, found at Turner's Falls on Connecticut River.

President Hitchcock also presented specimens of depressions found in the Sandstone of the Connecticut Valley. They were of regular polygonal forms, generally from five to eight sided, shallow, and about an inch in diameter. Similar depressions have been found in the Niagara Limestone of New York, of two or three feet in diameter.

Mr. Hitchcock suggested that they might have been made by tadpoles. He had observed these animals in the water contained in the excavations, and had been informed by boys that they had seen tadpoles in the act of excavating them. In 1850, Prof. B. Silliman, Jr., exhibited similar specimens to the American Association for the Advancement of Science, and read a letter from a gentleman suggesting the same explanation of their formation. This explanation Prof. H. had not heard of, until he had conceived the idea himself.

Mr. Hitchcock further stated that he was now doubtful, if the tracks which he had supposed to have been made by birds, in the Connecticut Valley Sandstone, were really produced by birds, since one great argument, viz: that of the number of phalanges in the toe, is lost. Tracks of an animal, which was certainly a quadruped, are now found, presenting the same number of phalanges and toes as the dinornis.

Specimens of Clay Stones were exhibited by Mr. Charles Stodder and Mr. Ambrose Wellington.

The Committee appointed to memorialize Congress, reported that they had prepared a memorial and forwarded it to Washington.

Dr. Weinland read a paper on series in the animal kingdom, as follows:—

ON SERIES IN THE ANIMAL KINGDOM. BY DAVID F. WEINLAND.

The existence of certain Zoölogical Groups, namely, those of Classes, Orders, Families, and Genera, was first noticed by the father of Zoölogy, Aristotle. Two thousand years afterwards, these groups were again brought to light and named by Linnæus. They have since been improved by Cuvier and Baer, and the idea of type has been added. But it was not till lately that the signification, at least of three of them, viz: of Classes, Orders, and Families, was recognized and circumscribed by Agassiz. These ideas will henceforth stand and be acknowledged as founded in nature.

But the question arises, whether there do not exist still other relations and real affinities of animals to each other, which are not included in these groupings, which have an equal right to be introduced into our zoölogical system.

We think that this is in fact the case, and we shall endeavor to show in the following sketch, that there exist throughout the whole animal kingdom affinities of the animals to each other, which we can comprehend under the name of "Series." About twenty years since, a German Naturalist, Kaup, spoke of series in the animal kingdom, but his ideas proving somewhat arbitrary, the subject received less attention than it deserved. Nevertheless, its truth, if rightly understood, has been since recognized by some distinguished naturalists. Oken, for instance, spoke of a scale among Articulata, in which he placed the worms lowest, next the crustacea, and last the insects; and Agassiz has illustrated this gradation fully in the development of the butterfly, and has added still another amongst insects proper; starting from the principle that chewing rank below the sucking insects.

Another order of position has been recognized by Milne Edwards and by Dana among Polypi; another by Leopold von Buch among Cephalopods; another by Dana for Crustacea. We have tried to trace out these gradations also, among the higher animals, and the success which we have met with, wherever we have had accurate information, has convinced us that such gradations, which might very properly be termed series, really exist throughout the animal kingdom.

Thus, among Mammalia, we have recognized until now two natural series running parallel to each other, a carnivorous and a herbivorous series. The carnivorous begins with the whales, runs through the dolphin, seal, and lutra, to the marten, whence it divides into two branches, one Plantigradous, the other Digitigradous. The latter of these branches runs through the cat, leopard, and dog, where it ends; the other, that of the plantigradous, runs through Nasua, Procyon, (raccoon,) bear, to the cynocephalous monkey, and through the higher monkeys to man. In this latter series, we would call the attention of naturalists particularly to the bear, as the intermediate link between carnivorous animals and monkeys. When we consider the mixed animal and vegetable food of the bear, its manner of life, and general habits, its climbing and embracing propensities — for in the bear we find an arm capable of embracing as in the monkey — and when we observe its manner of standing upright on its plantigradous feet, which is evidently connected with the use of the fore legs as arms, there can be no doubt that the bear fills out that gap which seems to exist between carnivorous animals and monkeys. Such is the carnivorous series.

Parallel to this, and analogous to it, runs a herbivorous series; beginning with the Zeuglodons, and running through Sirenoids, Morse, Dinotherium to Anoplotherium. Here it divides into two, the Pachyderms and the Ruminants, and thus Owen was right when he said that the Anoplotherium includes the characters of Ruminants and Pachyderms. From Anoplotherium starts on one side the Ruminant series, running through camel, cow, antelope, deer, — and on the other side, the Pachyderm series, running from Anoplotherium to Palæotherium and Tapir. At this point we have another division into the series of horses, which culminates in our domesticated horse, — and the series of hogs, which embraces rhinoceros, elephants, and hogs.

Among Birds, there are at least four series: one starting from the ostriches, and ending with the Gallinaceæ; — (I would remark, in passing, upon the striking similarity which exists between the ostrich and the young of the domestic fowl) — a second beginning with the pelican, and ending with the Gallinula, a wader; a third beginning with the hawks, and ending with the singing-birds ; a fourth beginning with Rhamphastos, and ending with the parrot ; another beginning with the Buceros, and ending with the swallow and humming-bird.

In Reptiles, there seems to be but one series, — snakes, lizards, and turtles ; the snakes moving by the dorsal column, and having head, neck, trunk, and tail united in one continuous body, are analogous to the whales, and the Sirenoids. The lizards, provided with a distinct neck, trunk, and tail, and with legs, are analogous, the lower ones, the Anguiformes, to the seals, the higher, to Lutra and Marten. In the turtles, the distinction of parts is carried still farther ; the head and neck are very free, the trunk which, in lizards, assists in locomotion, is scarcely used for this purpose, and the four legs are the locomotory organs. In the class of Batrachia we have again the same series. Cæcilia is snake-like, and wholly analogous to the snakes and to whales. Icthyoids and Salamanders, provided with small or well-developed legs, are wholly analogous to lizards, and the frogs and toads to turtles. In frogs and toads also, the four legs are the only organs of locomotion, but the neck and head are not as free as in turtles. This goes far to prove that the class of Batrachians ranks lower than that of Reptiles.

January 21, 1857.

The President in the Chair.

Dr. Henry Bryant read the following paper, entitled —

A LIST OF BIRDS OBSERVED AT GRAND MANAN AND AT YARMOUTH, N. S., FROM JUNE 16 TO JULY 8, 1856.

In the early part of last summer I made an excursion, in company with J. E. Cabot, Esq., to the island of Grand Manan and to Yarmouth, N. S.; principally with the view of observing the habits of the birds breeding in those localities. The following species were seen by us; those marked with an * only at Manan, and those marked with a † only at Yarmouth: —

* *Haliætus leucocephalus.* A pair of full-plumaged birds were seen every day at low tide, apparently watching for an opportunity of robbing the gulls of any thing worth the trouble.

* *Hypotriorchis columbarius?* A bird which appeared to be of this species was seen at Duck Island.

* *Otus Cassinii.* A nest of this bird was found by Mr. Cabot in the midst of a dry, peaty bog. It was built on the ground, in a very slovenly manner, of small sticks and a few feathers, and presented hardly any excavation. It contained four eggs on the point of being hatched. A young bird, the size of a robin, was also found lying dead on a tussock of grass in another similar locality.

Chordeiles Virginianus. Only a few individuals seen.

Chætura pelasgica. Quite common. A number of these birds were seen flying round the northeastern head of Green Island at Yarmouth, and were, without doubt, nesting there, as they were seen to fly in and out of the crevices of the rocks — the impossibility of ascending the face of the cliffs prevented an actual verification of the fact.

Hirundo Americana. Not so common as either of the other two species of the genus.

Hirundo bicolor. Very common; breeding in hollow stumps. Incubation had generally commenced by the 2d of June.

Hirundo rufa. By far the most common swallow, particularly at Manan. The nests were almost universally built without the projecting neck. Of late years, these birds, as they become more habituated to building in sheltered situations, have nearly discontinued their former habit of building their nests in a retort shape.

Tyrannula flaviventris. This pretty little Flycatcher was more numerous at Manan than at Yarmouth. Though apparently unsuspicious, it was difficult to procure, in consequence of its restlessness and its frequenting almost exclusively the thickest clumps of alders and small firs. In its habits it approximates more nearly to the warblers, than does any other species of the genus that I am acquainted with. During our walks in the roads and paths through the woods, it was never seen perched on a dry twig or overhanging branch, waiting for passing insects, as is the favorite habit of most of the genus; it procured its food almost entirely by diligently hunting in the thickest foliage, rarely venturing a short distance in pursuit of its prey. The note of this bird is also much softer than that of the other Tyrannulæ.

Setophaga ruticella. More numerous than I have ever before seen them. The young were hatched at Yarmouth before the 1st of July.

Myiodioctes Canadensis. Particularly numerous at Yarmouth among the small ferns and bushes on the edges of swamps.

* *Sylvicola icterocephala.* Only one pair seen.

Sylvicola æstiva. Common at Yarmouth, though not so much so as at Eastport. None were seen on any of the small islands.

Sylvicola striata. Abundant in the alders.

Sylvicola virens. This species was the most common warbler observed. The males could be seen and heard in every direction; the females were not so numerous, being probably engaged in incubation or feeding their young brood.

Trichas Marilandica. Common everywhere in suitable localities.

Mniotilta varia. Quite abundant.

Parus atricapillus. Not so numerous as with us at the same season.

† *Parus Hudsonicus.* Quite a number of these little titmice were seen on the Big Mud Island. A pair of old birds with their young brood were seen near Yarmouth on the 3d of July. Their habits seemed identical with those of the common species. Though the young were fully fledged and could fly with ease, the old ones were so solicitous for their safety that I could almost catch them in my hands. A nest was found near by that probably belonged to this family; it was built in a dead white-birch, in the same warm manner that the common Chickadee builds with us. The note resembles that of the common species, but is sharper and more filing, and can readily be imitated by the syllables *Tzee-dee-dee-dee* uttered with the front teeth in juxtaposition.

Turdus migratorius. This bird, so preëminently domestic with us, confining itself almost entirely during the breeding season to the garden or orchard, was extremely numerous, but had apparently lost its desire for human society. We found it nesting everywhere, in the thickest woods and most secluded pastures, much oftener than in the neighborhood of houses. The eggs of the second brood were already laid, and incubation commenced by the 25th of June.

Turdus olivaceus. One specimen was seen at Long Island, Manan, and another at the Big Mud, Yarmouth. Its note differs entirely from that of the *T. solitarius;* it also differs very much in its habits, the latter species being generally seen on the ground, while the olivaceous Thrush prefers to procure its food among the branches. The one seen at Big Mud was perched on the top of a small dwarf-fir, and was hunting the passing insects, with all the dexterity of a typical flycatcher.

Turdus solitarius. Very numerous. The plumage of the old birds was much worn by rubbing against the thick bushes that they principally inhabit; there was also much less of the yellowish tint on the breast than on specimens procured at other localities. The first brood had already left the parent birds. One procured on the 27th of June, was fully fledged, but so unlike the adult that I append a description of it: Wings, tail, and greater wing-coverts as in adult. Rump reddish-brown, with light yellowish-brown spots, most distinct towards the back. All the rest of the upper parts olive-brown, with a long lanceolate whitish spot in the centre of each feather, and the tip blackish-brown. Smaller wing-coverts ferruginous-brown, with spots of light yellowish-white, in the centre of each feather, occupying the greater part of the tip, and running to a point towards the base. Throat whitish in the centre, a black line on each side from the base of lower mandible to below the eye. All the under parts more yellowish than in the adult, with the sides of the neck, breast, and flanks spotted with blackish-brown — the spots being rounded on the centre of the breast, transverse on the upper part of the abdomen, and V-shaped on the side of neck and breast, most distinctly so on the latter. The general effect of the plumage is precisely the same as that of the *Dendrocolaptinæ.*

Zonotrichia savanna. Particularly numerous on all the grassy islands; incubation nearly completed by the 25th of June.

Zonotrichia Pennsylvanica. On arriving at Manan, we were at first much puzzled by a note that we had never heard before; the bird that made it was always perched on the top of some small tree or bush, and before being approached sufficiently near to identify it, would drop into the bushes beneath. On watching the spot and shooting the bird, that we supposed had made the note, it proved to be a White-throated Sparrow; but the note was so different from the soft warble made by that bird with us in spring, that for some time we supposed that we had shot the wrong bird. This note can readily be imitated by pronouncing the syllables *Pee-pee-pee-peebody-peebody*, rather slowly and in the same key. Few were seen in the neighborhood of houses, but wherever the woods were thin, with an undergrowth of bushes, or in bushy pastures, they were quite numerous.

Struthio nivalis. This common and neat-looking sparrow, as Dr. Brewer observes, takes the place occupied by the *Emberizella socialis* with us, and is, if any thing, more confiding and domestic in its habits. The young were universally hatched by the 25th of June. The note is almost exactly similar to that of the Chipping Sparrow.

Carduelis tristis. Not common.

Erythrospiza purpurea. Not more numerous than in Massachusetts during the breeding season.

Quiscalus versicolor. A few seen.

* *Corvus corax.* One pair seen.

Corvus Americanus. Very common; more so at Manan than at Yarmouth.

Garrulus cristatus. Common.

† *Garrulus Canadensis.* At Yarmouth, we saw more of this species than of the common Blue-jay. The name generally given it by the inhabitants is Cat-bird. The bird called Cat-bird with us, *Mimus felivox*, we did not see either at Manan or at Yarmouth. Some others of our common birds that were not seen by us were *Mimus rufus, Turdus Wilsonii, Sialia Wilsonii, Dolychonyx oryzivora, Fringilla graminea, Pipillo erythrophthalmus, Sturnella ludoviciana, Molothrus pecoris, Sterna argentea.*

Bombycilla Carolinensis. Not common.

Picus pubescens. Several seen.

* *Picus arcticus.* One pair seen at Manan.

Colaptes auratus. Not nearly as common as in Massachusetts.

† *Ectopistes migratorius.* A dead female was found on Green Island, twelve miles from Yarmouth. It presented no appearance of having met a violent death.

Totanus macularius. Very abundant on all the grassy islands. Incubation generally terminated by the 1st of July.

† *Totanus semipalmatus.* One pair seen. A nest was found by the boatman, containing, as usual, four eggs. This bird I do not think has been observed breeding on the New England coast north of Cape Cod.

Charadrius melodus. Abundant; breeding on all the sandy or gravelly beaches. The young were observed running about by the 25th of June.

Charadrius semipalmatus. Only a few seen.

† *Anas obscura.* One pair seen at the Big Mud Island.

Somateria mollissima. During our stay at Manan we saw a dozen or two of these birds, and obtained two eggs at the inner Green Island. At the Mud Islands they were much more numerous. A number of females with their young broods were seen. The largest of the young were about a quarter grown. On approaching them, they dived with as much apparent facility as the old ones, and did not rise till they were at a safe distance.

† *Sula bassana.* On arriving at Yarmouth, we were informed that we should find plenty of Gannets on Gannet Rock. But it was with a feeling of surprise almost as much as satisfaction, that on approaching the rock sufficiently near, we first saw the birds. The rock itself is a miniature of the Gannet Rock of the Gulf of St. Lawrence, as described by Audubon, and is as difficult, probably more difficult, of access. On approaching it, the Gannets were seen to the number of some hundreds, covering the northern end of the summit; they were quite shy, and had all left the rock before we had arrived within a hundred rods of it; they flew round our heads a few times, and then gradually disappeared. The number of full-plumaged birds was greater than I expected, as, from this being probably their most southern breeding place, I had presumed, in accordance with the common laws governing the migration of birds to the colder regions, that the majority would be in immature plumage. The number of brown birds was about one to three of the white, or adult birds. On

scrambling to the summit of the rock, we found the nests ranged all round its borders, most numerous on the northern aspect, where they formed a continuous row; they were very bulky, composed entirely of eel-grass, and were apparently used for more than one season, as several of them had been recently repaired. The whole surface of the rock, as well as the outside of the nests, was white from the droppings of the birds, and the nests themselves, viewed from a short distance, looked more like petrifactions than any thing else, encrusted as they were with urea. The number of the nests, by count, was one hundred and fifty. Not a single egg was found in any of them, as they had been recently robbed. The same day we saw a fisherman at Green Island, who said that the Monday previous he had taken sixty eggs from the rock.

Sterna hirundo. A dozen pairs were breeding on the inner Green Island at Manan, and many hundreds on Green Island at Yarmouth. In consequence of the facility of access to Green Island from Yarmouth, the birds are much disturbed. During the short time that we passed on the Island, two other parties landed for the purpose of egging.

† *Sterna arctica.* We found several hundred pairs of these birds breeding on one of the Mud Islands. It was the first time that I had ever found them breeding apart from other species of the genus, and was therefore much pleased at being able to examine a large number of their eggs, the authenticity of which was positive. On comparing them with a number of the eggs of the common tern procured at Green Island, no specific difference could be discerned. Some of the nests were made in the short grass at the edge of the beach, others on the masses of sea-weed that had been driven up by storm above the ordinary reach of the waves, and others were mere excavations in the sand and gravel of the beach. On examining specimens the moment they are shot, the pearl-gray tint of the lower parts is frequently not readily perceived, except in certain lights, and if this color were the only specific character, it would frequently be impossible to distinguish them from the common tern. This color grows gradually deeper after death, and finally becomes nearly as dark as that of the upper parts. The length of the bill varies considerably in this as well as in some other species of tern, the difference

being more than a quarter part of the length of the shorter specimens. The long external tail-feathers are also very variable in length, being an inch and a half shorter in some specimens, without any appearance of having been broken or worn. The only diagnostic character that can be depended on in specimens of all ages is the comparative length of the tarsi which are always longer than the middle toe in the common species and never longer in the arctic. The following table gives the comparative length of the tarsus and middle toes of three specimens of each species taken at random: —

	S. Arctica.			*S. hirundo.*		
	♀	♀	♂	♂	♂	♀
	1	2	3	1	2	3
Tarsus	*15	15	14¾	18½	20½	19
Middle toe	15½	15½	16	17	18	16

Larus argentatus. The favorite breeding-places of this bird, at Manan and the neighboring islands, were the heaths, as they are called by the inhabitants — dry, peaty bogs, covered with coarse grass, scattered bushes, and dwarf firs. The nests were generally placed so as to be sheltered by the firs or bushes, seldom in the open heath. I should imagine, from Audubon's description, that the number of nests on trees was greater at the time of his visit than at present. This may be accounted for by the fact that the breeding-places having been protected for some time by the owners of the islands, the birds have not been so much disturbed as formerly. On the Big Mud Island, near Yarmouth, they were also found nesting on trees. More or less were found breeding on all the islands we visited; but everywhere with the exception of the places mentioned, the nests were placed in the grass among the rocks, or on the rocks themselves. The eggs found in places where the birds had probably not been disturbed were about half hatched by the sixth of July. Dr. T. M. Brewer states, in the 6th Vol. of the Journal, page 304, that the *Larus leucopterus* is occasionally found breeding on the island near Manan. As this bird is quite rare with us, and has always been supposed to breed only on the shores of the Arctic Ocean, it was an object of special search both to Mr. Cabot and myself; but with the exception of a single pair of Saddle-backs, *Larus marinus*, no large gulls, other than the herring-gulls, were seen by either of us. All the inhabitants at Manan, with whom we conversed on this subject, stated that there was a bird, called by them Farmer Gull, larger than the herring-gull, with a dark head and shoulders, which was occasionally found breeding in solitary pairs on the rocky islands. This description of the farmer gull is probably correct as far as it goes, more particularly as their attention had been called to a specimen, unfortunately destroyed before our arrival, which had been procured for Dr. Brewer. When at Manan, we were told that we should find this bird much more numerous at the Seal Islands, near Yarmouth. On arriving at Yarmouth, we still heard of the Farmer Gull, and the same description was given of it as at Manan, but we were told that it was seldom seen there, though quite abundant at the Bay Chaleur. What species this bird may prove to be I do not know, but am inclined to think, if a described species, it is a black-backed gull in immature plumage, though the inhabitants who had been in the habit of seeing this gull, did not consider it the same as their so-called Farmer Gull.

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* Millimetres.

† *Larus marinus.* One pair seen at Big Mud Island.

† *Larus atricilla.* Two pair seen at Green Island near Yarmouth. Their nests were not discovered, but the birds were shot, and evidently, from the enlarged state of the oviducts of the females, had recently finished laying. This is another of the birds which are common on the shore south of Cape Cod, and mentioned by Richardson as inhabitants of the fur countries; they are not known to breed between Cape Cod and the Bay of Fundy.

* *Lestris Richardsonii.* One pair seen near Green Island.

Thalassidroma Leachii. This bird was found breeding in the manner described by Dr. T. M. Brewer, on some of the small islands near Manan; and also on the islands near Yarmouth, including the Mud Islands, mentioned by Audubon as the breeding places of the Wilson Petrel.

Mormon Arcticus. Only one specimen of this singular bird was seen near Manan, but at the islands in the neighborhood of Yarmouth they are still quite abundant. The only place where we found them breeding was at Green Island. One egg was found here laid in a crevice in the rocks. Several burrows were seen, much too large for the Petrels, and were probably made by the Puffin, but neither eggs nor birds were found in them.

Uria grylle. This bird was found breeding wherever the locality was suitable. On one of the islands near Manan, called the Inner Green Island, we purchased twenty from a man who had collected them there. From the number of inaccessible rocks in this vicinity, (the breeding-places by choice of this bird,) its number will not probably be much diminished for years. It breeds as far south as Mt. Desert on the coast of Maine.

† *Uria troille.* Gannet Rock is nearly divided, by a deep chasm, into two portions. On scrambling up its sides, we saw a number of guillemots standing on the rocky shelves of the most precipitous part; seven eggs could be seen within the space of three or four feet square; these were procured with great difficulty and some danger, by the boatman. They were all light blue, with fewer marks than is generally the case. Incubation had commenced in five of them. The birds were quite tame, and would occasionally alight on the rocky shelves within thirty yards of where we were standing watching them. Most of the time they were flying through the fissure in the rock, always coming from the same side, and passing sometimes within a few feet of our heads. On Green Island, a single young one was procured, apparently a few days old.

†*Alca torda.* A number of auks were seen at Gannet Rock and also at Green Island. Two eggs were found at the latter place, and an old female was caught alive by Mr. Cabot. A much greater number of the four last-mentioned birds was seen, than were apparently breeding in the neighborhood; this might very probably be caused by the larger proportion of them being barren birds. This fact was not ascertained, as it might have been, by dissecting a number of the birds, as we did not feel inclined to aid in their fast approaching extirpation from this their most southern stronghold.

Dr. Gould inquired how these birds compared with those of Northern Europe, and the Northwest Coast of North America. The Arctic circle has been considered one uniform Zoölogical Region; he had recently examined shells collected by Mr. Stimpson in Behring's Straits and upon the northwest coast of North

America, and had found many of them to be identical with those found between us and Labrador. One shell in particular, *Nucula thraciæformis*, he alluded to; one valve of this shell brought from Japan, exactly mated an opposite valve taken at Provincetown, Mass. At Hakodadi, Japan, the Arctic fauna exists, and some shells of our coast are found; whilst at Simoda the shells are those of the China seas. Birds can traverse the ocean in the northern regions where the continents approach each other, but it is a question if mollusca can travel such distances.

Dr. Bryant stated that the majority of our Arctic birds are identical with those of Europe; and that the Arctic Ornithology of the Western Coast of North America differs more from that of the Eastern Coast than the latter does from that of Europe. He also stated that the migration of birds is an interesting subject bearing upon this question, the causes of migration being by no means fully understood. This present winter, one of our most common migratory birds, the Song Sparrow, (*Zonotrichia meloda*,) is quite abundant in the vicinity of Boston, and two, which Dr. Bryant killed for the purpose of examining them, were fat and in good condition, showing that they had not suffered from the severity of the weather, or the want of food, causes generally assigned for the autumnal emigration of birds from this region.

Dr. T. M. Brewer stated that it had been ascertained that there is a greater diversity of species among the birds of the Eastern and Western North Atlantic coasts than was formerly supposed. Several species, bearing close resemblance upon the two continents, have been established to be different — for example, the Velvet Duck, the Peregrine Falcon, and the Fish Hawk. It was interesting to observe that, for no apparent cause in their organization different from that common to both shores, many birds are found only on one or the other shore; for instance, the Manx Shearwater, the lesser Saddleback Gull, the European Scoter, (differing only in size from the American,) are found only in Europe. Between the birds of the Atlantic and Pacific coasts there is more diversity, and also there are observable differences of distribution. Thus, Brunnich's Guillemot, found by Dr. Kane in latitude 70° North, and rarely found so far south as Massachusetts Bay, in midwinter breeds in the harbor of San Francisco, in latitude nearly corresponding with that of Richmond, Virginia. The *Uria grylle*, whose extreme southern breeding-point on the Atlantic is the Bay of Fundy, breeds also near San Francisco. It may be, however, that the Eastern and the Western birds will yet be found to be of different species. Dr. Brewer believed that they would be.

Dr. Pickering observed that the Song Sparrow lives all the year at Philadelphia. As to the passage of birds across the ocean, he could say that a flock of gulls kept company with the ship, in which he crossed the Atlantic some time since, the whole distance.

Capt. Atwood remarked that, as to fishes, it is often the most delicate, and those having the thinnest skins, which are the last to migrate.

The President stated that he had recently an opportunity, through the kindness of Dr. Bartlett, of New Bedford, of dissecting the eye of a Sperm Whale, and the parts surrounding it.

On examining the region of the eye, an enormous development of the muscles was immediately observed. The sclerotic coat of the eye was very thick, and likewise formed a very thick sheath around the optic nerve, imbedding the bloodvessels, and almost as hard as bone. It was found, however, to contain no ossific matter, and to be simply very dense fibrous tissue. Behind the globe of the eye, and occupying a large space, was a large venous plexus. The eyelids were thick, and the conjunctiva folded back in such a manner as to permit the eye to recede in the socket. The globe of the eye, together with the optic nerve, weighed three and a half ounces. The powerful retractor muscle, analogous to that of ruminants, weighed five and a half ounces. The other muscles seemed only indirectly connected with the globe, and their use seemed rather to be to open the lid than to move the globe. The muscles which were attached to the lids were of great size, and together weighed one and a half pounds. The object of such muscular power he could not divine. The vascular plexus distended would tend somewhat to force forward the eye, and a sphincter muscle behind the eye would have a similar effect; but these do not seem to demand such extensive muscular power.

Mr. N. H. Bishop gave an account of the Zonda Wind of South America.

The "Viente de Zonda" may be called a local wind, as it only blows in the vicinity of San Juan, of the Argentine Republic, S. A. The town lies at the eastern base of the Andes, three or four leagues from the outer Sierra, South lat. 31° 4′, (Molina,) long. 68° 57′ West, (Arrowsmith.) Behind the first sierra, in the valley of the Andes, are four or five farms which constitute the hamlet of Zonda, from which the wind is named. To all appearance, the wind is formed outside the range, and blows west upon the town; but some old guides pretend that it comes from off the snowy caps of the main Cordillera. It blows at all seasons, though in the month of August (midwinter) it is most frequent. This wind is hot and parching to the skin, and brings with it clouds of dust and dirt, that fill the houses of the people with fine sand. All persons leave their work and seek refuge in their houses, while many of the huts of the gauchos are blown away by the force of the wind. Most persons are troubled with severe headaches; those who have been suffering from diseases of the heart, find their complaints greatly aggravated, and frequently there are cases of sudden death. Three or four years since, five persons fell dead during Zondas in the month of August. The Zonda lasts sometimes but two or three hours, at other times more than forty-eight hours.

While the Zonda is at its height, a few puffs of cold air from the south announce a change, and immediately the weathercock veers from east and west to north and south, and a cold wind, equally as strong as the hot Zonda, now prevails from the south; all nature is refreshed, and men return to their labors.

Mr. Bishop stated that he had opened a communication with a North American residing at the base of the Andes, in South America, and that, through him, he hoped to be enabled to obtain specimens of natural history from that region.

The President exhibited the skeleton of a young South American Ostrich belonging to the Society, and pointed out some interesting anatomical features in the bones of the neck and leg.

The President also exhibited the Cranium of a Digger Indian, brought by Mr. Samuels from California. Its internal capacity was about seventy-six cubic inches, nearly the same as that of the Australian and Hottentot. The forehead was very narrow, and the posterior part of the head very broad.

The President likewise exhibited and pointed out the homologies of the cranial bones of a Python, the entire skeleton of which serpent belongs to the Society.

Dr. J. P. Reynolds presented, in the name of Rev. Louis B. Schwarz, a Bulbous Root, from Africa (15° or 18° S. L.) together with a gum found in the sandy soil. In the rainy season these roots throw out a leaf a foot in length, and produce a most beautiful flower. A resinous substance exudes from the bulbs when cut, and probably this resin, found in the soil, comes from the plant.

The thanks of the Society were voted to Mr. Schwarz for the donation. The plant was referred to Mr. Sprague, and the resin to Dr. Hayes, for examination.

Messrs. L. M. Dornbach, B. C. Ward, Charles Kessmann, and Edward Habicht, were elected Resident Members.

February 4, 1857.

The President in the Chair.

The Corresponding Secretary presented a communication from Mr. Charles Whittlesey, of Cleveland, Ohio, entitled "Remarks explanatory of a Section of the Drift or superficial Materials of the Northwest, from Lake Erie to the Lake of the Woods." Referred to the publishing committee.

A communication was read from Mr. E. S. Morse, of Portland, Me., on *Helix asteriscus*, and specimens of the shell were presented.

HELIX ASTERISCUS, Morse. Animal, short, bluish.

Shell, small, orbicular, very much depressed; whorls four, rounded above and below; banded by twenty-five to thirty very thin, transparent, and prominent ribs, very oblique, inclined backward; spire not rising above the last whorl; suture deeply impressed; umbilicus moderately large, showing all the volutions; finely striated between the ribs; in some specimens parallel lines may be observed. Color, light brown.

Dimensions: breadth, $\frac{1}{16}$ in.; height, $\frac{1}{32}$ in.

Found at Bethel, Me., in company with *Pupa pentodon* and *Pupa exigua*, Sept. 28, 1856.

Observations. This shell differs from *H. annulata*, Case, in being smaller, the umbilicus not so large, spire not elevated, intercostal space not marked with parallel lines, but finely striated; the color is also different.

Its peculiar thin, transparent ribs, depressed spire, and deep umbilicus, are prominent features that can never confound it with other species.

Mr. Amos Binney read the following communication from his brother, Mr. W. G. Binney, and presented the specimens referred to: —

PHILADELPHIA, December 27, 1856.

Enclosed you will find a suite of the common American Snail, *Helix thyroidus*, Say, for the Museum of the Society.

Being engaged in a careful study of the land shells of the United States, I am paying particular attention to their *geographical distribution.* In forming suites of all the species from every part of the Union, some interesting results have been reached. The snail in question has been found in nearly every section of the country, and probably exists in all the States east of the Rocky Mountains, with the exception, perhaps, of the peninsula of Florida. In New England it is comparatively rare. In the Middle States it is much more abundant, and reaches its maximum size. In the Southwestern States it is represented by the form which Dr. Gould considers as specifically distinct, and has described as *Helix bucculenta.* It is distinguished by its smaller size, the umbilicus being generally closed, and in many individuals it has a strong resemblance to *H. clausa*, Say. The specimens from Alabama are at once recognized by the greater quantity of calcareous matter in their shells, their larger size and peculiar yellowish tinge. Georgia specimens received from the Rt. Rev. Bishop Elliott of Savannah, are furnished with a strong denticle on the inner portion of the peristome, near the umbilicus. St. Simon's Isle, on the coast of Georgia, has a very peculiar variety, which has been furnished by Mr. Postell. It is at once distinguished from those of the main land, by a smaller and more triangular aperture, and elevated, pyramidal spire. Another curious form is found only near Philadelphia. It is only one half and often not more than one third the size of the Ohio shell — has a very orbicular aperture, generally not furnished with the parietal denticle. It seems restricted to the immediate vicinity of the city, those from New Jersey, only ten miles distant, being of the common form. Its resemblance to *H. bucculenta* will at once be noticed — a curious fact, when we consider that one is found on the primary formations, while the other is peculiar to the limestone countries of the Southwest. When fresh, the Philadelphia variety is of a pretty pink color.

Dr. A. A. Hayes read the following report: —

ANALYSIS OF A SPECIMEN OF GUM FROM AFRICA, PRESENTED BY REV. MR. SCHWARZ.

The specimen was transparent, of a fine red-brown color, externally hard and brittle; within, it was tough and slightly elastic. It dissolved in the mouth, becoming tough, like jujube paste, and gave the impression of agreeable sweetness; after a few minutes, a slightly acrid sensation followed, like that produced by unripe guavas. Its Spec. Grav. is 1.406.

In cold water it dissolves wholly, and the solution bears the addition of its bulk of pure alcohol. More alcohol renders it turbid, and as an emulsion it long retains its opacity and uniformity of diffusion. Alcohol does not dissolve it.

100 parts consist of —

Moisture dissipated at 212° F.	3.46
Pure colorless Arabine	83.42
Glucose	10.80
Salts and Earths	1.28
Coloring and acrid matter, and loss	1.04
	100.00

The coloring matter resembles a humate, having an alkaline base, and the salts obtained were carbonates of lime and potash, with silicate and phosphate of lime, and a trace of manganese oxide. All attempts to isolate the body giving the slightly acrid impression, failed, from its easy decomposition.

It will be seen, that, as a natural mixture of arabine and glucose, this specimen differs from the known gums. Excepting the coloring matter, it is also remarkably pure, and the glucose does not crystallize.

An examination of the bulb, which accompanied the specimen of gum, was made, so far as to prove that the bulb furnished a like body, apparently as an excretion. In the bulb, the gum is associated with a bitter principle, which seems to be lost as the gum matures.

Economically considered, this gum has some importance. As presented, it has all the valuable qualities desired for uniting surfaces by gumming. Its color can be removed, to adapt it to cases where color would be objectionable.

As a mixture of gum and glucose, having the peculiar elasticity found in jujube paste, it might be used with advantage in the manufacture of lozenges, and all preparations of a similar kind, into which gum and sugar enter in mixture, as well as in inks and water-colors. Being destitute of Bassorine, it cannot be substituted for other bodies for thickening mordant mixtures.

Mr. Sprague stated that he had been unable as yet to determine the species, or even genus of this bulb. In endeavoring to obtain further information relative to this plant, Dr. Reynolds had ascertained that the missionary station, where it was obtained, was called Otymbingo amongst the Ovambo tribe, about three weeks' journey from Walfisch Bay, the nearest seaport. The bulbs are found in very great abundance around the mission, in a poor soil of reddish-looking clay. During the dry season they give no evidence of activity; but when the average amount of water falls during the rainy season, they shoot out their leaves to the height of three or four feet. There is a kind of spiral turning of each leaf, and it is curved outward at the tip. The stem, which is four or five feet in height, bears several flowers. Mr. Schwarz considers the plant allied to the Amaryllis tribe, and is inclined to place it amongst the Brunswigia.

Dr. C. T. Jackson exhibited a very handsome specimen of Hematite Iron Ore, belonging to the Brandon Iron and Car Wheel Company. This iron is remarkable for its stalactitic character, and is probably of hydrous origin. It is composed of hydrated peroxide of iron, 85½ per cent., water, 14½ per cent., with a minute quantity of manganese and silica. This ore produces the very best kind of iron, and is easily smelted. It yields about fifty per cent.

Dr. Hayes stated that he had proved, from careful analysis and examinations of pseudomorphs, as well as the more ordinary forms of hematite, that the infiltration of an aqueous solution of silicates of proto-peroxides of iron and manganese, *caused the production of hematite.* The beautiful black, glossy covering, which confers so much beauty on the ores of iron not truly hematites, as well as the ore of manganese, is always composed of silicate of proto-peroxide of iron, with silicate of one or both oxides of manganese; and the compact peroxides of manganese, often owe their density and hardness to this compound.

Mr. T. T. Bouvé, referring to a discussion on a previous evening, upon the slide or fall of land upon the Presumpscot River, near Portland, Maine, some years since, in which discussion he had participated, read documents from parties who visited the locality immediately after the event occurred, in order to show that the views maintained by him were correct, viz: that the phenomenon was due primarily to a partial washing out of the substrata by the action of the river; — that it might be more truly described as a fall or sinking of the surface, attended with some sliding towards the river, which it crowded from its course, rather than to a sliding action alone of the surface, occasioning a denudation of the substratum of clay. The presence of this clay to such an extent on the surface, he described as resulting from its being forced up by the crushing weight of the soil over it, through the fissures and divisions that occurred above when the fall took place. This spread over the disturbed area to a considerable extent, and formed numerous hillocks. Mr. Bouvé then exhibited a fine series of concretions from the clay, most of which had a nucleus of some organic body. Among these nuclei were coprolites of fishes, fish-bones, joints of crabs, Balani, shells of the genera Mya, Bulla, Nucula, and Saxicava. These concretions, and those from other deposits of clay, are not, as has been supposed by some, mere balls or masses of clay which have become indurated by carbonate of lime imparted from the nucleus, but true segregations of carbonate of lime from the solution of this substance disseminated in the plastic clay. These bodies ordinarily contain about 50 per cent. of carbonate of lime. They do not always have a nucleus; on the contrary, those from many localities very seldom have any. These seem by no means necessary for their production. Undoubtedly the carbonate of lime in the plastic clay, acted upon by elective affinity, was led to draw itself towards certain points, and to arrange itself more or less concentrically about a centre where might be or not a nucleus of some foreign body. Why the carbonate of lime did not in such cases crystallize, is more than is clearly understood. Probably, it might have something to do with the mechanical action of the clay as a disturbing element.

In cases where the forms are flattened disks, or lenticular, as in some deposits, it may be supposed that the strata of clay were of different density. This would account for the flattening, inasmuch as the force, acting in a radius from a centre, would be more free to exert itself horizontally than otherwise.

Dr. Charles T. Jackson stated that he had several times, during his geological survey of the State of Maine, examined the slide on the Presumpscot River, in Westbrook, and had published a short description of it in his annual reports on that survey.

He agreed with Mr. Bouvé in opinion that an undermining of the strata of clay, by the action of the river, probably induced the slide, but he was satisfied that the strata of clay marl had slid forward toward the river as well as fallen from the original level of the remaining bank. Whether the frosts of winter cracked the clay at its junction with the bank now standing, and thus let in the water to the soft, plastic clay below, rendering it very slippery, or the desiccation of it had caused such a fissure, was unknown, but there cannot be a doubt that it was owing to the extreme plasticity of the under blue clay that the strata were enabled to slide toward the river, as they have done.

The positions of the fir-trees upon the clay bed prove a sliding motion of the mass toward the river.

With regard to the concretions found at the slide, Dr. Jackson stated that the clay marl in which they are found contains about ten per cent. of carbonate of lime, while the concretions generally contain as much as 50 per cent. He considered the crystallizing force of the carbonate of lime to be the cause of the concretionary structure and form of these bodies, the foreign bodies occasionally found within them serving as nuclei around which this semi-crystallization took place, the carbonate of lime segregating and carrying with it the inert particles of clay, the spheroidal form being that which would result from this action when the force was not adequate to the production of crystals. He illustrated this view by reference to the spheroidal structure of hyalite and of various hydrous silicates which form from a gelatinous paste in which there is not sufficient freedom of motion to allow of the formation of perfect crystals. In case there were a larger proportion of carbonate of lime in solution as a bicarbonate, the crystalline forms would become more perfect, as in the well-known crystallized sandstone of Fontainbleau, in which grains of silicious sand are forced into the form of calcareous spar by the energetic segregation of the crystallizing carbonate of lime; the sand being inert matter which was forced by the calcareous salt to enter into the crystalline form of the spar.

Similar illustrations were adduced from chemical experiments and observations in which spheroidal forms result, and also in which foreign bodies are forced to enter into the structure of crystals. He quoted the experiments of Beudant, which he had repeated, in which Prussian blue was included in crystals of nitre and alum. He also alluded to the effects of different menstrua, in modifying the forms of crystals or totally changing their forms, instancing the crystallization of sea salt in the forms of the regular octahedron in a solution of urea, whereas the cube is its usual form.

Dr. A. A. Hayes followed Dr. Jackson, in remarking on the concretions called claystones. Having inquired of Dr. J. how large was the proportion of sand in the Fontainbleau crystallized sandstone, and received for answer about fifty per cent., he said that he had often examined the spots where they were forming, and had noticed a growth equal to the size of a garden bean, to take place in the course of two or three weeks of wet, springtime weather. To form a just conception of the conditions, the fact must be kept in view, that the beds containing them are composed of fine silts, and in the case immediately under view, these were arranged in planes of deposition of alternate courses, covered by much finer material, in layers of different thickness; so that the mass was stratified; the coarser layers being very permeable to water. The rounded forms, often strongly resembling organic remains, are found resting between these layers, and a condition necessary to their formation is, *the presence in the layer or rock above them of abundance of carbonate of lime.*

The force exerted by some salts in their tendency to crystallize is brought into view only when we study their formation, and carbonate of lime is one of the constantly occurring salts which well illustrates, in a remarkable manner, this power of assuming regular forms. As has been stated, with fifty per cent. of its weight of *sand,* it forms regular rhomboids, but the more recent observations of some African travellers, who found their progress impeded by "stone plants," six or eight inches high, formed of aggregates of spear-shaped crystals of sand, cemented by carbonate of lime, show, that this large proportion may be exceeded, while the foreign material is in a somewhat *coarse state.*

In the formation of claystones, however, we are to consider the presence of finely-divided matter suspended in, or so mixed with water of infiltration in spring-time, or general saturation from position, that it has nearly a semi-fluid state. A saturated solution of bicarbonate, or more commonly crenate of lime, finds its way into the soft mass, by frost crevices, or channels left by roots, or even air bubbles, and at these points the concretions commence, when no nuclei of similar chemical composition exist. The finely-divided matter interposes an obstacle to the formation of crystals of carbonate of lime, far greater than an equal amount of coarser foreign matter would do; and we observe, then, the influence of that beautiful law in accordance with which *rounded forms* are produced. In the laboratory similar forms daily occur, where the presence of finely-divided and diffused bodies, arrests the formation of crystals, and globular, or curved-surfaced solids are produced; as in the animal frame, the cell structure causes the dissolved phosphate of lime to take the curvilinear form pertaining to organization. The claystones which are produced under the simple conditions here described, have no concentric structure; a slight conformity to this structure being observed, when a bubble of air, or a vacant space, marks the point of commencing deposition. In other cases, a shell in its calcareous composition offers a preferred nucleus, and as it contributes its lime salt, a concentric arrangement may be noticed in the forms resulting, especially after exposing them to heat. Rounded masses once formed become centres, or nuclei of secondary occurring aggregates, one central mass being surrounded by spheres attached; but in all it is easy to read the influence of the tendency of carbonate of lime to crystallize, and the opposition of the finely-divided silt, causing the particles of both to assume forms without straight bounding lines, as the polarizing force of crystallization is arrested in all directions.

It may be added that a great number of bodies present rounded forms dependent on a modification of this law of restrained crystallization, such as numerous iron ores, bog manganese, and even the more compact forms, where infiltrated solutions, forming part of the material, existed at the moment of aggregation.

Dr. Hayes made some remarks on the formation of macle crystals, the true theory of which he stated that he had many years since illustrated by numerous specimens and examples. Starting from the point where Beudant left the subject resting on a supposition, it occurred to him that the law was quite within the scope of a chemical demonstration, which would place this and similar instances of crystallization among known scientific facts. Without entering minutely into the matter, we may take as an example a salt exerting a strong tendency to crystallize from a hot solution on cooling,—ordinary saltpetre. A solution of this salt, in a pure state, slowly cooled, affords solid, six-sided prisms, or the crystals become solid if allowed to rest in the fluid, and we observe nothing but the result of ordinary crystallization. If the process has been carefully watched,—and it is a most interesting and instructive exhibition,—it will be observed that the particles of solid, so soon as they become visible, are rectangular, and that they are polarized. Motion may cause similar poles to approach within the limits of repulsion, when the particle turns and brings its opposite pole in contact, the union taking place at a certain angle, and the frame-work thus laid out becomes closed in by successive layers of polarized particles, forming a regular, solid crystal of a hexagonal form.

The same operation going on in a solution of the same salt, mixed with a solution of common salt, exhibits for some time the same process of construction; but it soon becomes apparent that a *solid prismatic crystal will not form*, and time does not change the condition of the solution. A frame-work, or *skeleton crystal* is built up as before, and possibly the interstices may be solidly filled, but there will appear a *hexagonal cavity in the centre*, *representing a considerable part of the volume of the crystal.* If we carefully seal this cavity and remove the crystal, we find the fluid contents to be a strong solution of common salt, and the interior of the crystal has quite finished surfaces. The suggestion at once arises that the crystal, having used in its structure all the saltpetre within reach, has completed its form with a strong solution of common salt. To test the correctness of this suppostion, we may substitute a solid body, choosing one which from its fineness can be diffused uniformly, and we shall find that a pure salt will, by its polarizing action on this suspended matter, *fill its cavity quite closely*, and make up its true solid crystal in part of clay, Prussian blue, or other bodies. Ranging through the ordinary salts, cooling from solutions, or the melted state, macle crystals will be obtained almost constantly, while in all cases of slow evaporation and avoidance of those conditions favoring the production of macles, solid transparent crystals only form. Employing thus many thousands of pounds, or only a few grains of salt, the operation of this law of *polarization extended to contiguous matter* is seen, and in the experiments alluded to, it was shown that its modified and more complex action gave beautiful results. Skeleton crystals, such as sublimates, and snow-flakes, and frost-work may be assumed to be *solid crystals*, at the instant of their formation: the vapor, or air, being polarized to fill the vacancies, which afterwards appear, gives the beauty and variety so strikingly presented by them.

Mr. Charles Stodder stated that Professor Hitchcock, in his "Final Report on the Geology of Massachusetts," 1841, devotes several pages to the subject of claystones. He says: "They are undoubtedly concretions, formed by laws somewhat analogous to those of crystallization. I freely confess, however, that so far as my means of information extend, the subject of concretions is involved in great obscurity."—*Report*, p. 406. "When broken, the concretion appears compact and perfectly homogeneous throughout. *In no case have I discovered a concentric or oölitic structure;* nor did the application of strong heat develop it." p. 409. "In a very few cases I have met with a pebble, or a congeries of coarse sand, near the centre of the claystone, which appeared to have been the nucleus around which the particles collected; but in ninety-nine cases out of a hundred, no such nucleus can be discovered; although it is undoubtedly true, that there must have been something to determine the particles to a particular centre." p. 410.

Since Professor Hitchcock's Report, Mr. Stodder was not aware that any observations had been made throwing any light on the origin or structure of these concretions. He exhibited two specimens, cut open,—one, No. 1614 of the State collection from Amherst, was, as Prof. H. found them, compact and perfectly homogeneous, and no nucleus was visible. The other, a very fine example of these claystones, from an unknown locality, was a depressed spheroid, almost a perfect circle in outline, presenting the markings which gave it the appearance of having been turned in a lathe, with an appendage on one side, apparently another spheroid attached to the principal one.

On cutting this open and polishing the cut surface, it displayed a concentric structure with slight variations in color. There was no lamination; the whole mass being perfectly compact, and the lines of colors not sharply defined, but fading almost imperceptibly one into the other; but the contrast of colors was sufficient, in a favorable light, to exhibit unmistakably the concentric arrangement of the material and the origin of the lines on the surface which give these concretions so much the appearance of works of art. There is a minute nucleus less than $\frac{1}{16}$ of an inch in diameter. The first concentric layer exhibits its arrangement about the nucleus in the form of an ellipse, assuming the spheroidal form at the outset; the succeeding layers extend the long diameter more than they do the short one; then a layer extends over the long diameter and one side only of the short; on the other side of the now lenticular body, the layer terminates before reaching the centre, and its edge makes one of the lines, that so much resemble the marks of the turner's tool. Other layers are added to the long diameter, only increasing the compression of the spheroid, their edges making each a line on both sides. The lines of color in the appendage before referred to are concentric with the centre of the concretion, showing that that was not formed around an independent nucleus as might be supposed by the external appearance.

The minute size of the nucleus, and its position outside of the centre, render it very difficult to be found without great care, and very liable to be destroyed by cutting or breaking the stone. No failure to find a nucleus is sufficient evidence that the concretion was formed without it.

Mr. Stodder also called attention to another form of clay concretion or segregation, which he saw some years since in Windsor, Ct.

On the bank of the Farmington River, was a bold, nearly perpendicular bluff of the Connecticut valley clay, stratified in horizontal layers of from half an inch to an inch, and perhaps two inches in thickness. The divisional planes between the strata were indurated, perhaps $\frac{1}{16}$ of an inch thick, and somewhat harder than the mass of the clay. Exposed to the elements the softer clay had been washed out between the hardened divisional planes, to the depth of one or two inches. Extending from one hardened plane to another, were cylindrical concretions of from $\frac{1}{4}$ to $\frac{3}{4}$ of an inch in diameter, at various distances apart. The bluff, seen in front, presented the appearance of small shelves supported by innumerable small columns, many of which had a small hole through the centre. They looked as if they might have collected about the rootlets of plants, but it is questionable whether roots would penetrate clay to the depth of ten or fifteen feet, or their direction would always be vertical.

The columns undoubtedly were not lime and clay like the claystones, but merely indurated clay, as none of them could be found at the base of the bluff, the fallen ones having decomposed.

Dr. Jackson referred to the Fossil from Lake Superior, which accompanied the collection of minerals presented by Dr. Kneeland at the last meeting, and which it was suggested by Mr. Stodder, might assist in determining the age of the copper-bearing rocks of that region. Dr. Jackson stated that the fossil was a Cyathophyllum, and undoubtedly came in the drift from the upper Silurian Rocks of the northern shore of the lake.

Dr. Jackson exhibited specimens of Aluminium, consisting of a table-fork made of the metal, some wire, foil, and an ingot. Aluminium is now obtained in France at the cost of nine dollars a pound, and Dr. J. has been informed by a manufacturing chemist that it will soon be produced at the cost of only four dollars a pound in this country.

The Corresponding Secretary read the following letters, viz: from the Regents of the University of New

York, January 15, 1857; the Royal Institution, November 26, 1856, acknowledging the receipt of the Proceedings of the Society; from the Société Imperiale d'Agriculture, &c., de Lyon, July 9, 1856, the Société Linnéene de Lyon, July 9, 1856, the Académie Imperiale &c., de Lyon, July 14, 1856, the Académie Royale des Sciences de Stockholm, August 1, 1856, presenting their various publications; from Dr. John S. Newberry, Washington, Dec. 22, 1856, acknowledging the receipt of his diploma as Corresponding Member; from Robert Kennicott, Esq., West Northfield, Illinois, January 15, 1857, acknowledging the donation of the Journal; from Isaac Lea, Philadelphia, January 2, 1857, and M. L. A. Huguet Latour, Montreal, Jan. 3, 1857, requesting that missing numbers of the Proceedings may be sent to them; from William Stimpson, Washington, Jan. 2d, 26th, and 29th, concerning his papers on the Crustacea of California; from Charles Girard, New York, Jan. 19, concerning his descriptions of new California fishes; from Charles Whittlesey, Cleveland, Ohio, Jan. 25, accompanying a geological paper.

Mr. Leander Wetherell was elected a Resident Member.

February 18, 1857.

Dr. C. T. Jackson, Vice-President, in the Chair.

Prof. H. D. Rogers read the following paper entitled,—

CLASSIFICATION OF THE METAMORPHIC STRATA OF THE ATLANTIC SLOPE OF THE MIDDLE AND SOUTHERN STATES.

The following is a concise sketch of the Geological composition of the Atlantic Slope of the Middle and Southern States, derived chiefly from a study of the formations of this portion of Pennsylvania.

Discarding from our present survey the newer deposits of the region, or those long, narrow, superficial troughs of unconformably overlying red and gray shales and sandstones of mesozoic, or middle secondary age, which partially cover the older or crystalline, and semi-crystalline strata, and restricting our attention to these, we shall find, — that when carefully studied, they rank themselves, so far as they admit of subdivision at all, into three natural physical groups. All the sedimentary mineral masses, without exception, are in a condition, more or less, of metamorphism or transformation from the earthy to the crystalline state by heat, and therefore using the term in a critical sense, all of them are Metamorphic Rocks. In the more current conventional application of this word, only some of them, however, pertain to the usually recognized Metamorphic or Gneissic series; others belong unequivocally to the Paleozoic, or ancient life-representing system, while others again constitute an extensive, intermediate group, not typically gneissic or granitoid in their degree of crystalline structure or metamorphism on the one hand, nor yet fossiliferous on the other, at least so far as the closest scrutiny can discover. For a long while, indeed, from the commencement of geological researches in this district of the Atlantic slope, until the geological surveys of Pennsylvania and Virginia had unravelled the composition and structure of the region, all of these ancient, and more or less altered strata of the Atlantic slope, from its summit in the Blue Ridge and South Mountain, to its base at the margin of tide water, were regarded and designated alike as primary rocks, and were supposed to constitute but one group, and that the oldest known to geologists. Early, however, in the course of those surveys, it came to light that by far the larger portion of the rocky masses of at least the middle and northwestern tracts of the Atlantic slope, including much of the Blue Ridge and of the Green Mountains, was of a different type and age from the oldest metamorphic, or true gneissic system. The evidence in support of this conclusion was, first, an obvious and very general difference in the composition of the two sets of strata; secondly, a marked difference in their conditions of metamorphism, and thirdly and more especially, a striking contrast in their directions and manner of uplift, the plications and undulations of the less metamorphic series, dipping almost invariably southeastward, while the gneiss presents in many localities, no symmetrical foldings, but only a broad outcrop, dipping to a different quarter. These structural dissimilitudes imply essential differences in the direction and date of the crust movements, lifting and transforming the respective groups, and led the geologists of Pennsylvania and Virginia to a conviction, that over at least many tracts, a physical unconformity, both in strike and dip, would be yet discovered. It was not, however, till a relatively late date in the prosecution of the geological survey of Pennsylvania, that the geologists of that State detected there positive evidences of this physical break, and interval in time between the two groups of strata, and established by ocular proof the correctness of the previous induction. This unconformity, reflecting so much light on the whole geology of the Atlantic slope, was first clearly discerned in tracing the common boundary of the two formations from the Schuylkill to the Brandywine, and the Susquehanna, but it was quickly afterwards recognized on the borders of the gneissic district, north of the Chester County limestone valley, and again, soon after, in the Lehigh Hills at their intersection with the Delaware.

Prior to the suspension of the geological survey from 1843 to 1851, the true Paleozoic Age of the non-fossiliferous crystalline marbles, and semi-crystalline talcoid slates, and vitreous sandstones of the Chester and Montgomery Valley, had been clearly demonstrated by the State geologist, through a comparison of the strata with their corresponding formations in a less altered condition further north; but it was not until the resumption of field research, upon the revival of the survey in 1851, that any distinctive fossils were detected in these greatly changed rocks, which even in their original state seem to have been almost destitute of their usual organic remains.

Assembling all the evidence which we now possess, we have in the Atlantic slope by actual demonstration but one physical break or horizon of unconformity throughout the whole immense succession of altered crystalline, sedimentary strata, and within this region but one paleontological horizon, that, namely, of the already-discovered dawn of life among the American strata.

This latter plane or limit, marking the transition from the non-fossiliferous or azoic deposits to those containing organic remains, lies within the middle of the primal series or group, of the Pennsylvania Survey, that is to say, in the Primal White Sandstone, which even where very vitreous, and abounding in crystalline mineral segregations, contains its distinctive fossil, the *Scolithus linearis.* The primal slates beneath the sandstone, and in immediate alternation with it, possess not a vestige of organic life, nor has any such been yet discovered anywhere within the limits of the Atlantic slope, or on the northern or western borders of the great Appalachian basin of North America, either in this lower primal slate, or in the other semi-metamorphic grits and schists physically conformable with it, and into which the true Paleozoic sequence of our formations physically extends downward. We have thus, then, two main horizons, subdividing the more or less metamorphic strata of the Atlantic slope into three systems or groups ; the one, a physical break or interruption in the original deposition of the masses ; the other, a life-limit or plane, denoting the first advent, so far as is yet discovered, of organic beings. As these two planes are not coincident, but include between them a thick group of sedimentary rocks, separated from the lower physically, from the upper ontologically, we are fully authorized, in the existing state of research, to employ a classification, which recognizes a threefold division of all these lower rocks. To the most ancient or lowest group, it is proposed to continue the name of gneiss, preferring, however, to call this division generically the GNEISSIC SERIES, employing sometimes the technical synonyme Hypozoic, proposed by Professor John Phillips, for these lowest of the metamorphic strata. To the great middle group, less crystalline than the gneissic, and yet destitute of fossils, the descriptive terms semi-metamorphic or Azoic are applicable. And to the third uppermost system, or entire succession of the American Appalachian strata from the primal, containing the earliest traces of life, to the latest true coal rocks, or last deposits of the Appalachian sea, it is here proposed to affix, as for many years past, the well-chosen title, conferred on corresponding formations in Europe, of the Paleozoic, or ancient life-entombing system or series. Thus we have the *Hypozoic* rocks, or those *underneath* any life-bearing strata ;

Azoic, or those destitute of any discovered relics of life; and *Paleozoic*, or those entombing the remains of the earth's most ancient extinct forms of once living beings.

The Atlantic slope of Pennsylvania includes all these three systems of strata. Where the azoic strata display their maximum amount of crystalline structure or metamorphism, they often simulate the true ancient hypozoic or gneissic rocks so closely, and they are indeed so identical with them in mineral aspect and structure, that the observer is baffled in his attempts to distinguish the two groups lithologically; nevertheless, it clearly appears, as the sections illustrating this country prove, that they are distinct systems, occupying separate zones, susceptible of independent definition on the geological map.

At the time of the first construction of the general geological map of the State, the true limits separating the hypozoic or gneissic from the azoic or semi-metamorphic rocks were but vaguely understood, and the State geologist did not venture to define them on the map, but shaded the one system into the other, indicating, however, what he has since proved, that the true gneissic rocks, in their southwestward course, pass out of the State at the Susquehanna, only a short distance north of its southern boundary, while the azoic, or talco-micaceous group, as a genuine, downward extension of the primal, paleozoic series, widens progressively going westward, until, from a very narrow outcrop at the River Schuylkill, it occupies at the Susquehanna the whole broad zone south of the limestone valleys of the Conestoga and Codorus streams in Lancaster and York counties. Since the revival of the field work of the survey, the dividing limit of these two sets of metamorphic strata has been traced and mapped with precision. To the southwest of the Susquehanna it has never, it is believed, been pursued through Maryland and the other southern States, though one may readily discern it in going northward or westward from Baltimore, or ascending the Atlantic slope in Virginia. In Maryland it crosses the Baltimore and Susquehanna Railroad about twelve miles north of Baltimore, and it is intersected by the Baltimore and Ohio railroad a little east of Sykesville; it crosses the Potomac above Georgetown, and the James River in Virginia, west of Richmond. The line of boundary is, however, not a simple one, but is intricately looped, in consequence of numerous nearly parallel anticlinal foldings of the strata, sending promontories or fingers of the older rocks, within the area of the newer or semi-metamorphic, to the west of their average boundary, and causing, of course, corresponding troughs, or synclinal folds of the newer, to enter eastward of the average boundary, the general area of the older. The Atlantic slope has received hitherto so little exact geological study, that we are, as yet, without the data for determining with any precision, either the succession of its much broken and closely-plicated strata, or the geographical limits which separate even the larger sub-groups. It is sufficient, however, for our present purpose, to show the existence and the approximate range of two great metamorphic systems, separated by a physical break; and the conformable relations of the later or upper of these to well known lower paleozoic formations of the Appalachian chain.

Mr. T. T. Bouvé said he was incredulous as to the matter of slates being so altered as to be mistaken for gneiss or altered into true gneiss; he questioned whether gneiss ever were a deposited rock.

Dr. C. T. Jackson made some remarks dissenting from Prof. Rogers upon certain points in the metamorphic theory, and adduced some observations upon the slates of Pequauket Mountain, in New Hampshire, in support of his views.

Prof. Wm. B. Rogers supported the theory of Prof. H. D. Rogers.

Dr. T. M. Brewer read the following

LIST AND DESCRIPTIONS OF EGGS OBTAINED IN CALIFORNIA BY E. SAMUELS.

Buteo montanus, Nuttall. The Western Red-tailed Hawk or White-throated Buzzard. This bird was first recognized as a distinct species by Mr. Nuttall, (Manual, 1840.) Its claims to this distinction have remained unrecognized until very recently. In the Proceedings of the Philadelphia Academy, Feb. 1856, Mr. Cassin, for the first time, refers to this hawk as a distinct species from the variety found in the eastern States. *(B. borealis.)*

Two eggs belonging to a bird of this species were obtained by Mr. Samuels near Petaluma, California, in 1856, one of which measures $2\frac{5}{16}$ inches in length, by $1\frac{14}{16}$ inches in its greatest breadth. The shape of the egg is an almost exact ovoid, slightly tending to a spheroid, one end being hardly perceptibly larger than the other. Its ground color is a very light buff, the spottings and markings giving to it the effect of a yellowish-white. The egg is marked over the entire surface with blotches, dashes, and lines of a light tint of a brown tending to Vandyke. These are mixed with markings of a lighter purplish-brown. The markings, of both shades, are chiefly oblong in shape, and run with the length of the egg. They bear no resemblance to any eggs of the *B. borealis* that I have ever seen, and are also quite unlike those of any other hawk, so far as I am aware.

The nest was discovered by Mr. Samuels, not far from Petaluma, California, close to the Mission House, near Petaluma Flat. It was built on the top of a large evergreen oak, at least seventy feet from the ground, and was constructed entirely of large, coarse sticks, lined with a few stray feathers. The eggs were two in number, and had been set upon a short time. The male bird was shot as it flew from the nest, which was so hidden by the thick branches that it would have escaped detection.

Buteo calurus, Cassin. Black Red-tail Hawk. This hawk is comparatively a new species, having been met with for the first time by T. Charlton Henry, M. D., U. S. Army, in the vicinity of Fort Webster, New Mexico, and described by Mr. Cassin in the Proceedings of the Academy of Natural Sciences, Philadelphia, February, 1855, p. 277. The specimen obtained by Mr. Samuels, with the egg, is the second that has been discovered at the present time, so far as I am aware. In regard to its habits and specific peculiarities but little is known, and its geographical distribution can only be conjectured from the two points, about a thousand miles apart, where the two representatives of this species were obtained,—Fort Webster and Petaluma.

The nest was found by Mr. Samuels on a hill north of Petaluma, California. It was built near the top of an evergreen oak, at the height of about sixty feet from the ground. The nest contained two eggs at the time it was discovered, which were just on the point of hatching. It was constructed of sticks, and was lined with moss. Both birds were about the spot. The male bird manifesting much more courage than his mate in resistance to the intruders, was shot. The female was wounded, but escaped.

The egg of the *B. calurus* measures $2\frac{4}{16}$ inches in length by $1\frac{3}{16}$ in breadth. Its capacity is considerably less than that of the *B. montanus;* its shape is a much more oblong oval; one end is evidently more pointed than the other. Its ground color is a dirty cream-white. It is covered, chiefly at the larger end, with blotches and smaller markings of a dark shade of a brown almost exactly corresponding with that known as Vandyke-brown, with smaller markings and spottings of a lighter shade of the same. The latter are distributed at intervals over its entire surface.

Buteo insignatus ? The Canada Buzzard or Brown Buzzard. In the collection of eggs obtained in California by Mr. Samuels, were two eggs of a hawk which he had no doubt belonged to a bird of this species. The parent was shot on the nest, but escaped into a deep ravine below, and was not obtained. The egg is different from that of any other hawk that I am acquainted with, and it has been assigned to this bird, on the strength of Mr. Samuels's impressions. It should be added, however, that his view of the bird was necessarily incomplete, and he may have been mistaken in regard to it. It is possibly the egg of *Buteo Bairdii*, (a variety of *B. Swainsoni*,) or it may belong to the *B. elegans*, all of which bear sufficient resemblance to the *B. insignatus* to be confounded with it, without an opportunity of closer inspection than he possessed. The nest was on a large white-oak, over a deep ravine, on San Antonio Creek, near Petaluma. It was very large, was constructed of coarse sticks, and was at least sixty feet from the ground.

In regard to the habits and the geographical distribution of this hawk, but little is known to naturalists. It was first described from a specimen belonging to the Natural History Society of Montreal, and obtained in that vicinity. Specimens have since been met with in California; but to what extent it is distributed through the intervening country remains to be ascertained. It is not improbable that it is a more common species on the Pacific coast, and that it is of rare and accidental occurrence in the eastern part of the continent. Dr. Heermann has ascertained that this hawk rears its young in California, where he met with both adult and young specimens.

The egg supposed to be that of this hawk, measures $2\frac{4}{16}$ inches in length by $1\frac{4}{16}$ in breadth. Its shape is an oblong oval, and neither end is perceptibly larger than the other. The ground color of the egg is a cream-white, but little obscured by markings or secondary colors. The egg is marked, chiefly at one end, with lines, dottings, and small blotches of a light reddish-brown. The lines with which one end of the egg is sparingly marbled are much darker, and are more nearly of a Vandyke-brown. The greater portion of the egg, especially that which corresponds with the smaller end, is free from any markings. This has no close resemblance to the egg of any other American hawk that I have ever met with, but most nearly approaches that of the Rough-legged Falcon from Labrador.

Hirundo bicolor. White-bellied Swallow.

Hirundo lunifrons. Republican or Cliff-Swallow.

Mellisuga anna. Anna Humming-Bird. Two nests with the eggs of this bird were obtained by Mr. Samuels. They are not new, but are probably to be found in few collections. The nest and eggs procured by Mr. S. correspond substantially with the descriptions and measurements given by Mr. Nuttall and quoted by Mr. Audubon. (Birds of America, Vol. X. p. 188.)

Tyrannus verticalis. Arkansas Flycatcher.

Scolecophagus Mexicanus. Brewer's Blackbird, Audubon. This bird was first met with in the territory of the United States by Mr. Audubon, who found it in the country about Fort Union, near the confluence of the Yellow Stone and the Missouri. He called it, supposing it to be undescribed, *Quiscalus Brewerii.* It had, however, been previously given by Mr. Swainson as *Mexicanus.* Mr. Samuels was so fortunate as to meet with several of the nests, with the eggs of this bird. The egg measures

$1\frac{1}{16}$ inches in length by $\frac{12}{16}$ of an inch in breadth. It is an oblong oval, but slightly pointed at the smaller end, and, except in size, bears some resemblance to the egg of the common Song Sparrow, *(Zonotrichia melodia.)* Its ground color is a greenish-white, over which are diffused, in most of the specimens, numerous blotches and markings of a ferruginous brown. The nests were in low bushes in wet places, and did not essentially vary from those constructed by the Red-winged Blackbird.

Agelaius gubernator. Crimson-winged Blackbird. The nests and eggs obtained by Mr. Samuels correspond with the description given by Dr. A. L. Heermann in the Journal of the Philadelphia Academy.

Cyanocorax Californicus. California Jay. This is probably the same bird given by Mr. Audubon as the Ultramarine Jay, *Garrulus sordidus*, of Swainson, and *G. ultramarinus*, of Bonaparte. Its eggs have been described by Dr. Heerman

Sturnella neglecta. Missouri Meadow Lark.

Zonotrichia grammaca. Lark Bunting.

Carpodacus familiaris. California Purple Finch.

Melanerpes formicivorus. California Woodpecker.

Ectopistes Carolinensis. Carolina Turtle-Dove.

Callipepla Californica. California Quail.

The Secretary read the following communication from Dr. James Lewis, of Mohawk, N. Y., addressed to the Corresponding Secretary:

I received yesterday the fourth sheet of Vol. VI. of the Proceedings of the Boston Society of Natural History, in which I find some remarks by Dr. Weinland relative to the causes of erosions on fresh-water shells. This subject has attracted my attention to a considerable extent, and I am glad there are others who are similarly interested.

Although I assent to the propositions of Dr. Weinland as being sufficient to explain the subject in some instances, I have not regarded the presence of small worms on shells, nor the presence of carbonic acid in water, as sufficient to account for the great diversity of appearances presented by the same species in different localities.

From what information I have been able to obtain in relation to the geological characters of various regions in which shells are found, it appears that those bodies of water having large quantities of calcareous salts in solution produce shells very little liable to erosion; while on the contrary, where there is very little lime, and the water holds in solution considerable quantities of saline alkalis and ferruginous salts, the shells are very liable to be eroded. Among the numerous specimens that I have, illustrating the above, are large numbers of shells from streams in Georgia, where the waters abound in saline alkalis. The shells are very generally eroded. I have also shells from other regions where the saline alkalis are more abundant than lime, and they present the same character.

I have also shells from Ohio, Illinois, Wisconsin, &c., which are from streams abounding in lime, and an eroded specimen is seldom to be seen among them, except, perhaps, a few aged shells that are evidently worn by long contact with abrading surfaces of other bodies.

I have also shells from a lake in Herkimer county, N. Y., nearly all of which have perfect beaks, and the few that are eroded are by no means as *chalky* in their texture as some specimens I have seen from localities deficient in lime. The bottom of the lake, in the instance specified, is a bed of marl.

But a more satisfactory proof that the freedom of shells from erosion depends on the relative proportions of various salts or alkalis in solution in the water, is presented in a limited body of water under my own immediate inspection.

Near the village of Mohawk, is a slowly-moving body of water, in which considerable numbers of shells are found. In those portions of this body of water where the various salts bear their natural and proper relation to each other, the shells are very perfect, and generally very free from erosions. But at and below, where the refuse ashes from an ashery are drained or leached into this body of water after every shower, a considerable quantity of saline alkalis finds its way into the water, where, in consequence of its specific gravity, it falls to the bottom, and every shell within reach of the influence of this alkaline matter, is more or less eroded, and most of them very much so. But further down, the shells grow more perfect, probably in consequence of the dilution of the alkalis, and their more general diffusion in the whole body of the water, by the influence of the slight current in it.

It may be thought strange that the presence of saline alkalis in water is urged as a cause of the erosion of shells, but it may be explained in this way. Where two or more alkalis are present in the food of an animal, and only one of them is necessary and proper to enable it to perform its healthy functions, the others may, in part, take the place of the proper substance, and if so, the shell formed under such circumstances would be more or less liable to erosion, in proportion to the solubility of the substituted materials.

We have now only to inquire respecting a locality producing eroded shells,—Is the water so highly charged with lime, that the presence of a more soluble alkali in small quantity can have no material influence in the *formation* of the shells? If the answer be yes, then we may reasonably ascribe the eroded character of the shells of such a locality *entirely* to minute parasites; but if there be a preponderance of saline alkalis in the water, they may be reasonably expected to enter into the organization of the shells, and a very slight abrasion of the epidermis of the shell from *any cause*, would expose the soluble alkalis to the solvent action ot water alone, and the remaining portion of the shell becoming less dense (and "chalky") by a removal of a portion of its substance, would, of course, wear away very rapidly. It is easy to understand why the beaks of bivalves, and the apices of univalves are first attacked by the erosive process. Firstly, the epidermis is thinner at those points: secondly, those portions of the shell formed in early life may be presumed to contain more gelatinous, and less calcareous matter, than the parts formed at or near maturity. I do not know demonstratively that this is the case, but analogy teaches it.

Dr. Gould observed, that shells in limestone waters are less liable to erosion, not from any difference in their composition, but simply because there is less tendency in such waters to abstract lime from the shell.

Prof. William B. Rogers suggested, that an analysis of shells from various waters should be made, to determine any difference in their chemical composition.

The Secretary read a letter from Dr. Samuel Kneeland on a supposed new species of Siredon from Lake Superior. The following account was subsequently received :

Siredon hyemalis, Kneeland. From 9 to 10 inches long; color on back olive-green, with a few small blackish spots, arranged for the most part in longitudinal rows, and with a few smaller spots varying in color from bright to rufous-yellow. A line, more distinct towards the tail, separating the olive-color of the back from the sides, which are of a purplish-brown, with more numerous yellowish spots sometimes coalescing into patches half an inch long and two lines broad; brightest on sides of head and tail. Under surface of body of an ashy-brown color, with a more or less distinct median white line, or linea alba; the yellow spots occur on the under surface of the jaw. From the nostrils, which are situated at the extreme corner of the truncated muzzle, about half an inch wide, there runs a dark line through the centre of the eye back to near the external gills; upper and lower segment of the iris of a yellowish silvery color. Tail flattened laterally, terminating in a rounded thin edge, more mottled than any other part of the body. Gills, three in number on each side, external, provided with an immense number of exceedingly delicate fringes, of a deep red color when the animal is breathing actively; these gills are kept waving to and fro in a most graceful manner during active respiration; when at rest they are shrunken, still, and colorless. Just behind these gills are the anterior extremities, about an inch in length, provided with four fingers, mottled like the sides of the body; under surface of the wrist and hand whitish, almost translucent, with the finger-tips black. About five inches further back are the posterior extremities, in size, color, and number of toes, like the anterior limbs. About three fourths of an inch behind the posterior limbs, is the vent, of a bright orange-red color, in some specimens surrounded with fringe-like projections. General shape and aspect of the head, snaky; some specimens, between the eyes and gills are much broader than others; average greatest width, just anterior the gills, 1¼ inch,—slight constriction in region of gills,—behind the last the body is cylindrical and eel-like, about an inch in diameter, gradually tapering towards the tail. The mouth is provided with sharp conical teeth, and the palatine roof is studded with them. Besides the motions of the gills, the animals suck in water which passes out by the narrow openings at the base of the gills. I have kept several of the animals for months, giving them nothing whatever to eat except what they got from the lake water, which I changed every day or two. The water of Portage Lake is very full of vegetable, and, probably, animalcular impurities, on which, doubtless, the creatures fed; but their teeth indicate more substantial food than this. They have been kept for months in clear spring water, so that the preservation of life is probably due rather to the tenacity of the vital principle in reptiles, than to any thing they find to eat in the water. The animals in my possession, have been frozen under ice half an inch thick, every night for three months, without any apparent diminution of their activity; though the water around them was not entirely frozen. I kept one an hour out of the water, during which time it became quite sluggish, occasionally opening its mouth spasmodically, as if to swallow water or air; at the end of the hour, on replacing it in the water, it soon regained its activity. Removing one entirely from the water, all motions of life had ceased at the end of four hours. Their motions in the water are very lively, and performed by the motions of the body and tail; they now and then come to the surface to take in or force out a globule of air; the last they often do under water. Their feet serve them for a slow and difficult locomotion on the bottom; when they move quickly in a jar their limbs are stretched at right angles, as if to steady the body; perhaps in a larger space they would be applied close to the body.

These animals are rarely if ever seen, except during the winter; those I obtained were sucked up through the pumps for the supply of the water for the copper stamps; they are never thus caught in the summer or autumn. They change their skin at this season; I have had several with the old skin hanging to the new in shreds and patches, which are washed off by the water in two or three days, leaving the colors of the new skin very bright; the edges of the tail are then so thin and transparent that the network of bloodvessels can be seen with the naked eye. The reason why they approach the shore at this season may be on account of this change in the skin, and possibly for breeding purposes. About once a week they pass from the anus a gelatinous mass, about the size of a pea, of a whitish color. I thought this might be possibly an egg, but the envelop soon becomes soft in the water, and its contents are lengthened out into a somewhat convoluted form. If this should not have been described, I would propose for it the name of *Siredon hyemalis.*

The Secretary read a communication from Mr. Robert Kennicott, of Chicago, informing the society that he had several living specimens of the Great-tailed Fox-Squirrel, (*Sciurus magnicaudatus*, Harlan,) which he held at the disposal of the Society or its members.

Mr. Kennicott also announced the organization of the Chicago Academy of Natural Sciences. President, Prof. J. V. Z. Blaney.

Dr. T. M. Brewer announced the organization of the California Society of Natural History, at Stockton. President, R. K. Reid; and presented its circular, which was referred to the Council.

Messrs. James R. Gatliff, of Buenos Ayres, and Russell Loring, of Valparaiso, were elected Corresponding members.

Messrs. Edward S. Rand, Jr., and John P. Robinson, were elected Resident members.

March 4, 1857.

Dr. C. T. Jackson, Vice-President, in the Chair.

Mr. Amos Binney presented, in the name of his brother, a Monograph on the group of American Helices represented by *H. fuliginosa.* Referred to the Publishing Committee.

Mr. Amos Binney also presented, in the name of his brother, the following paper:

DESCRIPTIONS OF TWO SUPPOSED NEW SPECIES OF AMERICAN LAND SHELLS, BY WM. G. BINNEY.

1. SUCCINEA LINEATA.

Testa oblongo-ovata, solidior, albida aut cinerea; spira elevata, acuta; anfractus 3 convexi, lineis parallelis inter rugas incrementales volventibus ornati; sutura impressa; apertura orbiculata-ovata, oviformis, partem testæ dimidiam æquans; columella plicata, callo albo induta.

DESCRIPTION.

Animal not observed.

Shell oblong-ovate, with three very convex whorls; spire elevated, acute; surface marked with irregular wrinkles of growth, between which are coarse parallel revolving lines, somewhat removed from each other. Aperture large, about as long as one half of the whole length of the shell, egg-shaped; columella folded; a deposition of callus on the parietal wall of the aperture.

Greatest diameter, 6; alt. 12 millimetres.

Geographical Distribution. Collected in considerable quantity by Dr. F. V. Hayden, on high hills near Fort Union.

Remarks. The specimens collected being dead and eroded, it is impossible to say what is the color of the shell when fresh. It is probably ashy white, resembling the true S. *campestris* of the Southern States. The revolving lines which distinguish it at once from every other described American species, are more apparent on the middle of the body whorl. These are quite coarse, and placed at irregular intervals;—on some specimens scarcely discernible. The aperture is unlike that of any other of our species; being correctly egg-shaped,—it is nearest in form to that of *S. campestris*, but is less expanded. The parietal wall of the aperture is unusually horizontal.

In general aspect it resembles somewhat *S. vermeta*, but is distinguished from that shell by its more oval shape, and the greater convexity of the whorls. It is the heaviest American species.

HELIX INTERCISA.

Testa solidissima, luteo-cinerea, apice rufâ, globoso-conica; spira brevis; sutura impressa; anfractus quinque, convexiusculi, lineis parallelis volventibus, valdè demissis, strias incrementales distinctas intercidentibus notati; anfr. ultimus globosus, supra peripheriam fasciâ unicâ, rufâ obscurissimâ ornatus; apertura maximè obliqua, formâ equi calcei, rotundata; labrum albo-cinereum, incrassatum, subtus reflexiusculum, subunidentatum, umbilicum totum tegens; marginibus approximatis, callo interjunctis.

SYNONYMS AND REFERENCES.

Helix Nickliniana. Lea. var. Binney Terrestrial Mollusks, II. p. 120, III. pl. VI. f. 1. *Icon in medio posita.*

DESCRIPTION.

Animal not observed.

Shell globose-conic, with five slightly-rounded whorls; spire little elevated; suture distinct; upon the body whorl a dark revolving band, hardly discernible; aperture very oblique, shape of a horseshoe; peristome thickened, heavy, dirty white, slightly reflected at the umbilicus, which it entirely conceals near its junction with the columella, furnished with a tooth-like process, the extremities connected by a heavy ash-colored callus, which is spread more lightly over the whole parietal wall; epidermis grayish yellow, apex rufous. The striæ of growth are very numerous and distinct, crossed by numerous, regular, revolving lines, so deeply impressed as to entirely separate them into small sections; thus the whole surface of the shell is divided into minute, raised parallelograms, separated by the deep longitudinal and horizontal furrows.

Greatest diameter, 22; less, 19; alt. 15 millimetres.

Geographical Distribution. Found in Oregon Territory.

Remarks. This shell I found in the collection of my father, Dr. Amos Binney. It was labelled H. Nickliniana, Lea. var., and as such is figured in the terrestrial mollusks. I cannot believe, however, that any species can admit of varieties differing so much as this does from *Nickliniana.* To Mr. Lea's figure and description it bears no resemblance whatever, either in shape or sculpturing.

It may readily be distinguished among the Helices of the Pacific coast, by its grayish, heavy shell, its thickened lip, and above all, by the peculiar markings of the surface.

Dr. A. A. Hayes exhibited a specimen of rock guano, from a lately-discovered deposit on an island not far distant from the main land in the Atlantic Ocean.

Dr. Hayes called attention to this substance chiefly, as an illustration offered of the solution and subsequent deposition of phosphate of lime from decomposing bones. Referring to a paper which he lately read here, in explanation of the chemical action, he showed that the solution of bibasic phosphate, eliminated from tribasic phosphate of lime, had penetrated into and cemented not only the phosphate of comminuted bones, but had united a mass of bivalve shells; in some cases actually removing the excess of carbonate of lime, leaving a partly bibasic phosphate behind.

He had examined a number of cases of this transference, and found sand and gravel aggregated by the phosphate which had been removed from bone-phosphate, through the agency of carbonic and crenic acids, formed in the humid decomposition of the animal matter present in the bird droppings,—so as to form a compound rock.

The facts already observed prove that mineral masses containing phosphate of lime, may be thus formed from animal phosphate of lime, and present all the characters which we recognize in the phosphate of lime engaged in the oldest slates. Additional interest has been given to this subject, by communications from Prof.

Booth of Philadelphia, and Dr. S. L. Snowden Piggott of Baltimore, who have analyzed specimens, in which the phosphoric acid had combined with both oxide of iron and alumina.

Dr. Hayes stated that the economical value of this substance is great, as a mineral fertilizer, it differing in this respect from the common guano which derives its importance in agriculture from its organic elements.

Dr. Hayes also gave an account of the formation of Monk's Island, with the probable changes that its surface had undergone.

Dr. Bryant read the following communication on a supposed new species of Turkey recently described by Mr. Gould.

In the January number of the Annals of Natural History, Mr. Gould describes a new species of turkey, from the mountains of Mexico. In the same article, he states that the domestic turkey did not originate from the common wild turkey, *Meleagris gallopavo ;* grounding this assertion principally on two facts, namely, the difference in the structure of the two birds, and their not readily breeding together. How far climate and other influences may have affected the domestic variety in England, I do not know, but with us neither of these statements is correct. If it were not for the difference of plumage it would be impossible in many cases to distinguish the two birds ; and even with this aid it is sometimes very difficult to decide with certainty when the specimen is a female. I can give no reason why the wild turkey should be unwilling to breed with the domestic variety in England, except that they are probably kept in confinement, to which even the domestic bird with us unwillingly submits. At any rate, this is not the case in the United States. The wild turkey breeds here with the tame variety quite as readily as could be expected ; whenever wild turkeys are numerous, it is an ordinary occurrence for the tame hen to prefer the wild gobbler to the domestic ones. I have had in my own possession wild hens that bred with a tame gobbler, a fact much stranger than that of the wild gobbler breeding with the tame hen. But the most satisfactory proof of their specific identity is that the offspring of mixed blood is known to be both hardier and more prolific than the more domestic variety,—a fact which cannot be reconciled with the theory of specific difference.

Dr. C. T. Jackson exhibited specimens of Aluminium and several of its most important alloys with other metals, and read a condensed *resumé* of the various communications on the subject contained in the *Comptes Rendus* of the French Academy of Sciences.

The three most interesting alloys of aluminium are those with silver, copper, and zinc.

When five per cent. of aluminium is added to pure silver it increases the hardness of the metal and improves its quality for plate, since this alloy is capable of receiving a high polish, and is less liable to corrosion than the usual alloy of silver with copper.

When ten per cent. of aluminium is fused with pure silver, a much harder alloy results, which is still quite malleable and takes a resplendent polish. This alloy also resists the action of sulphide of hydrogen which at once blackens pure silver and its usual copper alloy. It is also well adapted, from its superior hardness and stiffness, for the manufacture of forks and knives, and plate made of it is less liable to be scratched and defaced by use.

The effects of aluminium on copper are quite remarkable, and a very small proportion of aluminium is found to change the color of copper to that of gold, while the alloy is much softer and more ductile than pure copper. The whitening power of aluminium when alloyed with copper, is much greater than that possessed by zinc, and the alloys with aluminium are all malleable both when hot and cold.

A specimen of an alloy of one hundred parts by weight of copper and five parts by weight of aluminium was of the color of British gold coin. and was readily rolled out into sheets thin as letter paper, it working as easily as fine silver.

It is stated in a communication published in the *Comptes Rendus*, that this alloy is not affected by sulphide of ammonium ; but this Dr. Jackson finds to be an error; for the moment a drop of the sulphide is let fall on this alloy a deep red spot is produced, and this quickly changes to a perfect black stain.

When larger proportions than 10 per cent. of aluminium are melted with copper, the alloys become hard, and ultimately, by increasing the proportion of aluminium, the alloy is made brittle.

The alloy of 10 per cent. of aluminium and 90 of copper is malleable, ductile, and has a golden color, but it is not capable of withstanding the action of acids or of sulphide of ammonium.

An alloy of 10 parts of aluminium and 90 of zinc is malleable, and takes a very brilliant polish with the lustre and color of highly-polished steel.

Dr. Jackson remarked that we know, as yet, but little of the uses of aluminium and of its alloys, and that the introduction of the new metal, at moderate cost, into the workshops of our mechanics and artisans, is likely to open a new field for enterprise in metallurgy.

Numerous experiments are required, and larger quantities of the alloys should be made, so as to test their properties and value in a practical way, and the sacrifice of some hundreds of pounds of aluminium could well be afforded in view of the useful results that would be obtained by experiments with its numerous alloys.

Were aluminium works erected in this country, it is probable that the first few years' production from them would be consumed in experiments by our practical artisans, or be sold for specimens to schools and colleges, or to private gentlemen. By manufacturing this metal on a large scale, the cost of its production can undoubtedly be made quite moderate. It is stated that it can now be made in Paris at a cost of nine dollars a pound. This is a considerable reduction from the former prices, for the specimens now before the Society cost one hundred and sixty dollars per pound.

The following paper was read at the meeting of October 1st, 1856, by Dr. David Weinland.

A PSYCHOLOGICAL VIEW OF THE MOTIONS OF ANIMALS, BY DR. DAVID WEINLAND.

There is hardly any part of the science of natural history which has been so little studied as the psychology of animals.

The ability to descend to the level of the mental constitution (ψῦχὴ) of animals, to understand their feelings, thoughts, and desires, seems to have diminished in proportion to the progress of civilization; or, at least, in proportion as cultivated minds of civilized nations have secluded themselves from free nature in cities and students' closets. Still, we think the psychology of animals is by no means the least interesting subject of human thought. It is acknowledged that man is the crowning work of creation, and this has been proved and illustrated often enough by comparison of the structure of his *body* with that of other vertebrates; by showing that there exists an ideal series of development from the horizontally moving fish to the erect man. Now, may not this truth be as clearly, or more clearly traced, in following out the degrees of development of the psychical element, from the low, feeding, and propagating fish, to man as made in the image of God—that is, thinking in the same categories with him. Undoubtedly such a series of psychical development exists, but its steps have never been marked out, though many materials have been collected in regard to the subject. In the effort to attain a method of studying this part of the science of nature, the following considerations have occurred to me.

We know the condition of a man's soul, or of its representative in an animal, only by external manifestations. Thus, in order to have a standard of comparison for the different degrees of psychical development of animals, we may start from an analysis of what is called the characteristic of animals, in opposition to plants, namely, voluntary motion.

In considering closely the motions of a dog, we recognize in them two entirely different kinds. One, and that by far the most common, serves only and immediately the animal itself as the means by which to obtain whatever it desires and enjoys, (food, for instance,) and to shun whatever it dislikes. This kind of motions we may call subjective; that is, selfish motions; because they serve only the subject itself. But again, we see another kind of motions. Thus, the dog plays with other dogs, with other animals, and with man. It makes many movements with the head, eyes, ears, and tail, which serve no other purpose than to show to other animals, or to man, the present condition of its inner nature; to show them what it feels, what it thinks, and what it seeks. These motions are not subjective; they are made in relation to the inner natures of others, and therefore may be properly called sympathetic motions. Which of these two kinds of motions is the higher? Undoubtedly the latter. All animals have the first; the second are not common to all. Does an hermaphrodite worm, for instance, know that another being lives and feels? If not, it has no sympathetic motions.

Having considered how to view the motions of an animal, let us return to our problem, namely, to find a standard for the comparison of the different degrees in which, in the series of animals, the mental constitution is developed; and to show that the greater or less degree of development of the sympathetic motions in an animal, and of its organs to perform them, exhibits at the same time, the degree of its psychical development. That such is the case is because no degree of this development, beyond eating and drinking, can possibly exist, except in society with, and in regard to, fellow-beings. All those animals of higher mental organization, are social animals, or, at least, are connected by certain psychical relations, with other animals. Thus, among insects, the hymenoptera rank psychically very high. The greater part of them live in communities; that is to say, each individual lives and cares not only for itself, but also for its fellow-citizens. It knows that it belongs to a certain community, has certain duties there, &c.; and whenever we admire the sagacity of a bee or an ant, it is its working and thinking in relation to other beings that we admire. Moreover, only animals which are social by their nature, can be domesticated; that is, made friendly to man. Man himself becomes human only when in society with fellow-men. Children lost in forests when young, growing up there, resemble beasts. The higher the civilization of men, the closer and more complicated are the relations between them. Now if this be so; if the social life is the only field where, in men or in animals, a higher growth of the spirit is possible; and if with man the social life is far more developed than with any other member of the animal kingdom, we may draw our final conclusion, namely, that we can determine the psychical rank of any animal, from a knowledge of the degree of its ability to manifest itself to its fellow-beings, or, what is the same thing, of its organs for sympathetic motions.

An example may illustrate the truth more fully. Let us look at these organs in a fish, a lizard, and in man. The fish rests horizontally in the water; the head, neck, and trunk form one bulky mass; the dorsal column itself is the locomotatory organ; the four limbs, fins, are used for balancing the body; the ears are rudimentary; the eyes stiff, cold, without eyelids, and thus without expression, and from their position and slight mobility, of a very narrow horizon; there is no voice with which to call a companion. What means has this animal, by which to show to another being what it feels? Now as we see in fishes hardly any organs for sympathetic motions, or senses for sympathetic perceptions, we think we are justified in saying, that there must be also in them very little sympathetic feeling or thinking. Let us rise some steps further in the series of vertebrates, to the lizard,—that quick, lively, sagacious animal. While in fishes, the greater part of the body, and all four limbs, are used in locomotion, we find here four developed legs, the body nearly exempt from the function of locomotion, and thus capable of further differentiation; and the head, neck, trunk, and tail are distinct. With the distinct neck, and consequent ability to turn the head, are immediately connected, not only a larger horizon, but also many motions which manifest whatever moves or excites the animal. Together with the larger horizon, the eyes are very well developed, and the play of the eyelids (which are wanting in fishes and even in snakes) gives expression; so much, indeed, that I have been able to tell from a glance at the eyes alone of some lizards which I once kept alive for a long time, and which were tame, whether they felt well or not. The ears, also, the organs of the real social sense, are well developed in lizards; and though the animals themselves have no voice, still they seem to like music. The tongue, which rarely exists in fishes, and when present, is a mere organ for swallowing food, has here not only become an organ of touch, but a means of expressing sympathy, for I have seen them licking each other in play. In turtles, which are higher than lizards, we find already a voice; and even the fore feet are used as organs for sympathetic motions. Prof. J. Wyman, in observing two of our common pond turtles at the breeding season, saw the male gently stroke the head of the female for some minutes.

Rising a step higher, we find in birds the voice developed to a high degree, but yet confined to a narrow range of modulated sounds. In mammalia, the organs for sympathetic motions are more developed than in birds, except, perhaps, those connected with the voice, although even this point remains to be settled. In mammalia, we find the first hints of what shall come in man. The first idea of an arm, we find in the bear,—it embraces; and this idea of an arm is connected with the ability to stand erect upon the flat of the foot. In mammalia, too, we first find the idea of a hand, hinted at already in the bear, but carried out more fully in the monkey. The features of the face we find remarkable in the dog, and still more so in the monkey. We could find a like series in the organs of reproduction, which from this merely natural view, must be considered organs of sympathy. It is interesting to consider hermaphroditism from this standpoint: it will be evident that it cannot occur in any animal of high psychical endowments. We will in addition, merely call attention to the fact that fishes have no organs of copulation, or very rudimentary ones, that in many species the male does not know the mother of the eggs which it fecundates, while on the other hand, some reptiles, many birds, and most mammalia live in pairs, or, at least, their males and females go together throughout life, helping and taking care of each other. All the family life, the only fountain of moral and intellectual beauty, rests in the distinction and voluntary union of the sexes, and this distinction and union only make possible the highest unity of two beings which exists.

We will dwell no longer on these steps, but consider man himself. If our principle of coincidence of the degree of psychical development, with the degree of the development of the organs of sympathetic motions, be true, we must find these latter in their highest condition in man. And so it is. Man, standing upright on his feet, has all his body free for sympathetic motions; and the organs by which they are performed are here in perfection. What we saw in the fish as a balancing instrument, in the lizard as a mere locomotatory organ, is in man an arm which embraces the child, the friend. With the hand, of which we saw no sign in the fish, which is a foot and a locomotatory organ in the lizard, and the same in all mammalia, even monkeys, man grasps the hand of his fellow-man, and shows him what he feels, and with it, he emphasizes his language. Here are the features of the face, expressing by the most diversified play of motions, the varying conditions of the spirit, telling love and hate, joy and pain. Here are the eyes, the mirror of the soul. All these organs we find in a lower condition, in the higher mammalia, especially in monkeys. But there is one kind of sympathetic motions, which man alone enjoys,—those employed in language,—the power to express fully his ideas, his emotions to other men, by modulated sounds, produced by the complicated motion of the larynx, the tongue, the lips, &c. Many animals, it is true, have a voice, but none of them can express a series of thoughts or feelings. The cry of an animal is always the last concluding word of a sentence. It may be the result of a series of thoughts, but this series itself is never expressed. Men have also this kind of sounds—the sounds of laughing, crying, and many others: thus the war-cry of the Indian is no language; it is an animal sound, like the cry of a wolf, when it calls others to help. But all men have, beyond these animal sounds, the free, flexible language. They not only show to each other, some of the points of their thinking, and feeling, and willing; they show, or can show, all the process which goes on within; that is, their inner natures can, by means of language, communicate with each other freely. We recognize in language the highest kind of sympathetic motions.

Conclusions. Firstly, when trying to study the psychical endowments of animals, we have to start from the study of their motions, as the only manifestation of their mental constitutions (ψῦχὴ) which we can perceive. Secondly, There are to be distinguished in animals two kinds of voluntary motion,—the subjective and the sympathetic. The latter furnish the principal data for the study of the psychical rank; for every higher endowment flows from the sympathy of one feeling and thinking being with another. Sympathy is only a flowing forth of love, and love is the fountain of all moral and intellectual beauty in man.

Mr. C. J. Sprague stated that he had been informed by a friend, who had recently visited Singapore, of a curious fact, viz: that many of the bodies of the natives who are killed by the tigers, are left unconsumed, and that, upon an average, one body daily is found with the neck dislocated.

Dr. Charles Pickering observed that undoubtedly many bodies are found, but probably a much larger number are carried off by the tigers into the thick jungles, and consumed at their leisure.

Dr. A. A. Gould presented, in the name of J. P. Couthoy, Esq., specimens of corals taken in seventy feet of water from the well-known wreck near the Island of Magdalena. The vessel has been under water about forty years, and consequently these corals are not above that age. He supposed them to be the largest specimens found upon the wreck, and suggested that they might aid in determining the rate of coral growths.

Capt. Atwood exhibited a bottle of oil, a specimen of a substance which is occasionally thrown up on the shore of Provincetown, and which is supposed to come from the remains of the brig Hollander, which was lost some twenty years since in that neighborhood, and which was probably laden with linseed oil.

The specimen was referred to Dr. Hayes for examination.

Dr. Bryant exhibited several of the birds presented last year by the Victoria Society, at Melbourne, and a portion of Mr. Samuels's birds from California.

Dr. Gould presented, according to the directions of the late Dr. Binney, the third volume of the Terrestrial Mollusks and Shells of the United States, described and illustrated by Dr. Binney, and edited by Dr. Gould.

March 18, 1857.

Dr. C. T. Jackson, Vice-President, in the Chair.

Dr. A. A. Hayes reported that the specimen of linseed oil which was referred to him at the last meeting, had been tested. It was found to be slightly acid, in consequence of well-known reactions taking place between a minute quantity of fermentable matter expressed from the seed and the oil, resulting in the production of an oily acid. The oil is not, however, in the state which it assumes on exposure to air, but closely resembles fresh-drawn oil, in all respects but odor and slight acidity. When boiled as usual, it becomes capable of forming the elastic film after exposure to air, and its useful properties have not been lost or impaired after its long submersion in sea water.

In answer to a question from Mr. Mills, as to the composition of pudding-stone, Dr. Hayes replied that he had made a somewhat extended examination of the cementing material of the Roxbury conglomerate, and found that it is silicate of lime generally. There are cases where finely-divided slaty argillite forms, with silicate of lime, quite large quantities of cement, uniting pebbles of considerable size; but these exhibitions are only another feature, referable to the action of the same silicious compound. The rock contains chlorine, and as chloride of calcium is readily decomposed by hydrous silica, it might be assumed that the silicate of lime was thus formed. But the conglomerate is very frequently traversed by bold dykes of trap, which contain a large amount of sulphuret of iron, and the fissures in the conglomerate, being often filled with sublimed quartz, the more probable supposition is, that the silicate of lime was formed by the transportation of silica in the heated vapor of water. Such silica would combine with the lime and alumina of the comminuted slates, and form the cement at the points where we now find it.

In reply to a question, Dr. Hayes expressed as his conclusions, respecting the silicification and consequent preservation of organisms,—that the process proceeded, step by step, with the change of the organism into gaseous or aqueous matter. The mollusca may be considered as simply *organized water*, for one hundred parts by weight, often contain ninety-seven parts of water, volatile at 150° F. The cell walls of albumino-gelatinous matter are permeable, and the infiltration of aqueous solutions of silicate of lime, would displace the water, gradually depositing silica in a hydrous state, while the lime passed out with the water. As consolidation is hastened by the decomposition of the animal matter, the cell walls become changed, and the carbon or humus, in excess over that which can become gaseous or aqueous, remains; retaining as a mere skeleton the forms of the walls. These silicified forms are always porous, and the flints contain the carbon of the organic matter, unevenly distributed. As a beautiful illustration of silicification, he referred to the specimens of trees from California, frequently found in the explorations for gold; many of the specimens presenting the sap vessels entire in all their delicate organization and nearly natural color, while near by, on the same piece, may be seen black portions, in which the organized forms are lost, and the color is deep black. This striking diversity is due to the fact that the wood at some points had passed into the last stage of humus,—carbon and water,—before silicification took place, and hence the specimens present us with both silicified wood and silicified charcoal. He observed the same changes, though less obvious, while examining the highly interesting locality on the Island of Antigua, and at a future meeting will exhibit illustrative specimens.

Dr. C. T. Jackson remarked that he had examined the materials which enter into the composition and cementation of sandstones and conglomerates, and had found the cements to be different in different cases. In some, carbonate of lime forms the principal cement, in others, oxide of iron composed a large proportion of the cementing matters, and in others, finer particles of the same rocks that composed the conglomerate had formed a paste, which had been hardened by the agency of heat and by the production of silicate of lime derived, undoubtedly, from the decomposition of chloride of calcium. He stated that when pebbles are moistened with a solution of chloride of calcium, and then placed in contact and heated, the chlorine of the chloride of calcium escapes, and the oxide of calcium or lime unites with the silex and forms silicate of lime. There could be no doubt that the chloride of calcium was derived from sea-water. Sometimes in the vicinity of trap dykes, as at Purgatory, near Newport, Rhode Island, specular iron ore, evidently derived from sublimation of oxide of iron from the chloride of iron, had invested the pebbles with a thin crystalline film, which served as a cement. He stated some experimental results of M. Gay Lussac, on sublimation of specular iron ore, from chloride of iron, and his observations on the production of this ore in the crater of Mt. Vesuvius; experiments and observations which Dr. Jackson had repeated and verified.

The cementing materials of some sandstones are so largely calcareous, that on removal of the carbonate of lime by the action of acids, the stone crumbles into sand. In such sandstones the carbonate of lime was probably infiltrated as a bi-carbonate, and on losing one equivalent of carbonic acid, the carbonate of lime would solidify in crystalline form and firmly unite the sand, making it into a solid rock.

If a sandstone, cemented by carbonate of lime, is exposed to a high temperature, silicate of lime would be produced by combination of silex with the lime, and carbonic acid gas would be disengaged.

Dr. Henry Bryant called the attention of the Society to some of the birds presented by the Royal Victoria Society of Melbourne, Australia.

Among them was a pigeon resembling more nearly the *Phaps elegans* of Gould than any other species he had found described; but differing sufficiently from Gould's description to lead him to believe that it might prove to be a new species. The difference consists in the present specimen having a whitish line beneath the eye, not found in the *P. elegans*, and in the back being a greenish brown, with slight metallic reflections, instead of "deep, rich, lustrous chestnut," as described by Gould.

One of the birds on the table did not belong to the Society, but was placed there merely for exhibition. It was one of three belonging to a gentleman of this city, which had been mounted by the taxidermist. It was the Magnificent Trogon, (*Calurus resplendens*, Gould,) one of the most brilliant birds known, and though it would not, perhaps, bear a minute comparison with some of the humming-birds, yet, from its size and graceful plumage, it must be unsurpassed as seen in its native wood.

Dr. Bryant also remarked, that, in consequence of the unusual mildness of the weather in February, the bluebirds and other of the earlier migratory birds, made their appearance this year by the 15th, nearly a month earlier than they ordinarily arrive from the South; and that, although the weather had subsequently been quite severe, (the thermometer falling to near zero,) the bluebirds had remained with us, and were singing and apparently enjoying themselves at this low temperature.

In reply to a question from Mr. Wetherell, as to the production of sugar from the Chinese Sugar-cane raised in this neighborhood, Dr. Jackson stated that crystallized sugar could not be profitably made, but that a syrup suitable for food or distillation could be obtained. The amount of crystallizable sugar in the plant increases the farther south the plant is raised. Dr. Jackson has obtained a certain quantity of crystallized sugar in the cane grown at Watertown, Mass.

Dr. Durkee exhibited the Algæ brought from California, by Mr. Samuels, and Dr. Bryant exhibited some of the birds which had been recently mounted.

The Corresponding Secretary announced the receipt of the following letters, viz: —

From the Linnæan Society, London, Nov. 25, 1856, Entomological Society, London, Dec. 3, 1856, Geological Society, London, Dec. 4, 1856, American Philosophical Society, March 13, 1857, and the Société de Géographie, Paris, Feb. 7, 1857, acknowledging the receipt of the publications of the Society; Naturforschende Gesellschaft, in Emden, Oct. 2, 1856, and the Académie des Sciences, Paris, Feb. 14, 1857, presenting their publications.

Mr. A. M. Gay was elected a Resident Member.

DONATIONS TO THE MUSEUM.

January 7, 1857. Specimens of impressions in the Connecticut Valley Sandstone, possibly made by tadpoles, by Prof. Edw. Hitchcock. (See printed Proceedings, Vol. VI. p. 111, for an account of these impressions.) *Emys marmorata*, *Crotalus lucifer*, and *Rana longipes*, from California, by E. Samuels. *Regina Kirtlandii*, from Illinois, by Robert Kennicott.

January 21. Cranium of a Digger Indian, from California, by E. Samuels. A Bulbous Root, and a specimen of Gum from Africa, by Rev. Louis B. Schwarz, (For an analysis of this gum and an account of the plant, see printed Proceedings, Vol. VI. p. 129.) A white-throated Sparrow, (*Fringilla Pennsylvanica*, Aud.) a Rusty Blackbird, (*Icterus pecoris*, Aud.) and a Yellow-rumped Warbler, (*Sylvia coronata*, Aud.) together with a Black Squirrel, (*Sciurus niger*, Linn.) all from Lake Superior; by Dr. S. Kneeland, Jr.

February 4. Specimens of a new minute species of Snail, *Helix asteriscus*, Morse, from Bethel, Maine; by E. S. Morse. A suite of *Helix thyroidus*, Say, from various localities; by W. G. Binney. Specimens of Red Gum Wood and the Common Building-Stone of Australia, by O. H. Holden.

February 18. Four crania of birds; a fragment of the jaw-bone of an alligator, illustrating the development of the teeth; an egg-shell with a peculiar protuberance; and some fossil shells from Georgia; by Dr. H. Bryant. A specimen of Silicified Wood from the Colorado Desert, California; by W. P. Blake.

March 4. Corals, taken in seventy feet of water from the Spanish wrecked vessel off the Island of Magdalena; by J. P. Couthoy. Two specimens of Downy Woodpecker, (*Picus pubescens*, Linn,) from Milton; by E. Samuels. Minerals from California and a neuropterous insect, *Corydalis cornutus*, from Boston; by S. Adams.

March 18. The Saw of a Sawfish taken in the Persian Gulf and a Fossil, *Mycraster cor-anguinum*, Agass.; by Rev. J. P. Robinson. A Glossy Finch, (*Amadina nitens*); Beautiful Weaver-Bird, (*Hyphantornis personata;*) and an undetermined species of Hyphantornis; by Dr. F. J. Bumstead.

BOOKS RECEIVED DURING THE QUARTER ENDING MARCH 31, 1857.

Terrestrial Air-Breathing Mollusks of the United States and adjacent Territories of North America, described and illustrated by Amos Binney. Edited by Augustus A. Gould, M. D. 4to. Vol. III. Plates. Boston, 1857. *From the Heirs of Amos Binney.*

Descriptions of Terrestrial Shells of North America. 12mo. Pamph. By Thomas Say. Philadelphia. 1856. *From W. G. Binney.*

Annual Report of the Geological Survey of the State of Wisconsin. By J. A. Percival. 8vo. Pamph. Madison, 1856. *From J. A. Lapham.*

On the Avoidance of Cyclones, with Notices of a Typhoon at the Bonin Islands. By J. Rodgers, U. S. N., and A. Schönborn. 8vo. Pamph. New Haven, 1857. *From W. C. Redfield.*

First and Second Reports on the Noxious, Beneficial, and other Insects of the State of New York. By Asa Fitch, M. D. 8vo. Albany, 1856. *From the Author.*

Notes on American Species of Cyclas. By Temple Prime, L. L. B. Part I. 8vo. Pamph. The Hague, 1857. *From the Author.*

Prodromus animalium evertebratorum quae in Expeditione ad Oceanum Pacificum Septentrionalem observavit et descripsit W. Stimpson. 8vo. Part I. pp. 1–13. Philadelphia, 1857. *From the Author.*

Report of the Commissioner of Patents for 1835. Agriculture. 8vo. Washington, 1856. *From the Hon. Henry Wilson.*

Memoir of James Brown. By G. S. Hillard. 8vo. Boston, 1856. *From Messrs. Little, Brown & Co.*

Nachrichten von der Georg-Augusts-Universität und der Königl. Gesellschaft der Wissenschaften zu Göttingen, 1855. 12mo. Pamph. *From the Society.*

United States Astronomical Expedition in 1849–52. Vol. VI. Under direction of Lieut. J. M. Gilliss. 4to. Washington, 1856. *From Lieut. J. M. Gilliss.*

Narrative of the Expedition of an American Squadron to the Chinese Sea and Japan, in 1852–4, under Commander M. C. Perry, U. S. N. 4to. Washington, 1856. Vols. I. III.

Report of Commissioner of Patents for 1855. Arts & Manufactures. Vols I. II. 8vo. Washington, 1856. *From the Hon. Chas. Sumner.*

Magnetical and Meteorological Observations at Lake Athabasca and Fort Simpson. By Capt. J. H. Lefroy, and at Fort Confidence in Great Bear Lake, by Sir John Richardson. 8vo. London, 1855.

Ichthyology. Article in Encyclopædia Britannica. 4to. Pamph. London, 1857. *From Sir John Richardson.*

Quadrature of the Circle, &c. By A. Young. 8vo. Pamph. Burlington, Vt., 1853.

Theory and Laws of Solar Attraction. By A. Young. 8vo. Pamph. St. Albans, Vt., 1856. *From G. F. Houghton.*

Rendiconto della Società Reale Borbonica. Anno, 1855. 2 Nos. Naples.

Memoria sullo Incendio Vesuviano del Mese di Maggio, 1855, fatta per incarico della R. Accad. delle Scienze dai Socii, G. Guarini, L. Palmieri ed A. Scacchi. 4to. Pamph. Naples, 1855. *From the Accademia delle Scienze.*

Canada at the Universal Exhibition. 8vo. Toronto, 1856.

Tables of the Trade and Navigation of the Province of Canada, for 1855. 8vo. Toronto.

Annual Reports for 1854 and 1855 of the Normal, Model, Grammar, and Common Schools in Upper Canada. 8vo. Pamph. Toronto.

Reports of the Superintendent of Education for Lower Canada. 8vo. Pamph. Toronto, 1850, 1851, 1855.

An Act to regulate the Militia of the Province. 8vo. Pamph. Quebec, 1855.

Acte des Municipalités et des Chemins de 1855. 8vo. Quebec.

Annual Reports (1830–1836) of the Natural History Society of Montreal. 18mo. Pamph. Montreal.

Catalogue de la Collection Envoyée du Canada à l'Exposition Universelle de Paris, 1855. 12mo. Pamph. Paris, 1855. *From L. A. Huguet-Latour.*

New York Journal of Medicine. Vol. II. Nos. 1, 2. 8vo. New York.

Silliman's American Journal of Science and Arts, Nos. 67, 68.

Schriften der in St. Petersburg Gestifteten Russisch Kaiserlichen Gesellschaft für die Gesammte Mineralogie, I. 8vo. St. Petersburg, 1842.

Notices of the Meetings of Members of the Royal Institution of Great Britain. Part VI. 8vo. July, 1855–6. London, 1856.

Also, List of Members, &c. Pamph. London.

Kongl. Vetenskaps-Akademiens Handlingen, fur 1853, 54, 55. 8vo. Stockholm.

Proceedings of the American Philosophical Society. Vol. VI. No. 56. July–December, 1856. 8vo. Pamph. Philadelphia.

Memoirs of the American Academy of Arts and Sciences. New Series. Vol. VI. Part. I. 40. Cambridge, 1857.

Proceedings of the Academy of Natural Sciences, pp. 1–16, and 87–94. 8vo. Pamph. Philadelphia, 1857.

Bulletin de la Société de Géographie. Tome XII. 8vo. Paris, 1857.

Canada Naturalist and Geologist. Vol. II. No. 1. Montreal, 1857.

Transactions of the Linnæan Society of London. Vol. XXII. Part. I. 4to. London, 1856.

Journal of the Proceedings of the Linnæan Society. Botany. Vol. I. Nos. 1–3. Zoölogy. Vol. I. Parts 1–3. 8vo. London, 1856.

List of the Members of the Linnæan Society of London. 8vo. Pamph. 1856. *Received in Exchange.*

Annals and Magazine of Natural History. Nos. 108, 109, 110, for Dec. 1856, and January and February, 1857. 8vo. London. *From the Courtis Fund.*

Encyclopædia Metropolitana. Vol. XII. 4to. London, 1856. Also. Vol. I. Part 4, containing Dissertation 6th, Mathematical and Physical Science. 4to. Pamph. London, 1856. *Deposited by the Republican Institution.*

April 1, 1857.

Dr. D. H. Storer, Vice-President, in the Chair.

Dr. A. A. Gould offered the following preamble and resolutions relative to the decease of Prof. J. W. Bailey, and they were unanimously adopted :—

In addition to those immediate and corresponding members who have been recently removed by death,—men of original research and large contributors to the extension of the boundaries of science,—men equally notable for their blameless lives and scientific attainments,—Forbes, Johnston, Redfield, Thompson, Harris, Warren,—we have now to associate the name of Bailey, for a long time one of the professors at West Point. None who have had the good fortune to know him can fail to appreciate his truly philosophical spirit, his zeal, his accuracy, and his extreme modesty.

With his early life I am unacquainted, and so far as I know, the first paper of any extent which he communicated, was one which he read to the Association of Geologists and Naturalists at their meeting in Boston in 1843, entitled "Sketch of the Infusoria of the family Bacillaria, with some account of the most interesting species which have been found in a recent or fossil condition in the United States." It extended to upwards of fifty pages, was illustrated by six plates and gave him at once a high place among scientific men. Since then he has published numerous papers, mostly in Silliman's Journal, on the microscopic forms of animal and vegetable life, to which, and to the perfection of the microscope as an optical instrument, he chiefly limited his investigations. Prof. Harvey, in the introduction to his work on the Algæ of North America, thus writes: "Well known in his own peculiar branch of science, he has found a relaxation from more wearing thought in exploring the microscopic world, and his various papers on what may be called 'vegetable atoms,' (Diatomaceæ) are widely known and highly appreciated. From him I received the first specimens of United States Algæ which I possessed; and, though residing at a distance from the coast, he has been of essential service in diffusing a taste for this department of botany." I think none will gainsay me when I characterize him as the Ehrenberg of America,—and that in having been selected to preside at the next meeting of the American Association for Science, he had received but a merited honor.

Resolved, That in the death of Prof. Jacob W. Bailey, we, in common with the numerous scientific associations with which he was connected, deplore the loss of a true philosopher, a laborious coadjutor, and a most amiable man.

Resolved, That we tender our sympathies to the deeply-afflicted survivors of his family left orphans by the sudden and heart-rending removal of a mother, and by the premature death of an endeared father.

Captain N. E. Atwood, of Provincetown, having been requested to favor the Society with some remarks upon fishes and their habits, related many interesting facts which had come to his knowledge during a life spent as a New England Fisherman.

He first remarked upon the senses of taste, smell, sight, and touch. It has been said by eminent ichthyologists that taste and smell are very imperfectly developed in fishes; but this is not the fact. Many fish are very particular in the choice of food; others, such, as the mackerel and blue-fish, and mid-water and top-water fish generally, seem to be governed by sight in their selection of food. He had often seen mackerel, when they were abundant around a vessel, take all the bait that was thrown overboard, but at the same time carefully avoid the baited hook. He had also noticed that tobacco thrown overboard was seized by mackerel but immediately rejected, showing as he thought a sense of taste. It is to be presumed, however, that taste must be imperfectly developed in animals which have a tongue more or less cartilaginous, and covered with recurved teeth; being obliged unceasingly to open and close the jaws for the purpose of respiration, they cannot long retain food in the mouth, but are obliged to swallow it without mastication.

The sense of smell seems to be well-developed in some fishes. For instance, the ground swimmers generally have a choice as to their food. Halibut and cod are attracted a great distance with certain kinds of bait. Herring, when fresh and in good condition, will be very readily taken by cod, but when it has become stale from long keeping, it will be rejected. Crustaceans, also, as lobsters and crabs, are attracted by certain bait, which leaves no doubt that they likewise possess some sense of smell. Although the cod seems to swallow almost any thing that comes in his way, even stones, wood, and fragments of nearly every thing thrown overboard, Mr. Atwood had never seen an univalve mollusk in its stomach. The bivalve shell is found, and the bank clam is very common in the stomach, the shells being placed within each other in the most compact manner, when there are several of them in that organ.

In some other ground swimmers, both bivalve and univalve mollusks are found. The haddock, ling, catfish, and one species of flounder are great shell-eaters, and very frequently undescribed species of mollusca are taken in their stomachs.

The cod lives mostly upon live fish. It is very greedy, and even when distended with food, it will bite briskly at the hook. It is frequently taken with a full-grown mackerel partly in its stomach and partly in its mouth, with the tail still projecting. At other times, when the alimentary sack is empty, it appears to have no desire to partake of food. When kept alive in the holds of vessels, no other nourishment is given the cod than the minute animalcules contained in the water. A very curious fact Mr. Atwood stated that he had observed,—the cod often swallows alive the tant or sand-eel and the pipe-fish, both having heads very much elongated anteriorly and pointed. These fish sometimes pierce the stomach of the cod and escape into the abdominal cavity, and there they are found in a perfect state of preservation, adherent to its walls, but changed in color to a dark red, and in substance so hard that they are not readily divided with a knife. They have to be cut away before the cod can be split open. The fish is always in good health apparently, and there are no marks of inflammation about the stomach or abdominal cavity, unless the material of attachment be considered as such.

Fish migrate considerable distances in quest of prey, sometimes totally deserting localities where they have been very abundant. There is a species of crustacean called commonly by fishermen the sea-flea, which infests spots upon the Grand Banks, hundreds of square miles in extent, and which drives before it the cod and other fish. During his last voyage to the Banks, Capt. Atwood tried to fish with clam bait, which, however, came up untouched; he then put on menhaden for bait and lowered to the bottom, but upon raising the hook nothing was found but the skeleton of the fish, the soft parts having been consumed by the sea-flea.

Dr. Chas. Pickering observed, with reference to the sense of smell in fishes, that he had examined the brain of the shark, and that in this, as well as in cartilaginous fishes generally, the development of the olfactory nerve and the olfactory lobe of the brain was very considerable.

The chairman, Dr. D. H. Storer, called attention to the last volume of the work on the Terrestrial Mollusca of the United States, by the late Dr. Binney, edited by Dr. A. A. Gould, a copy of which had been recently presented to the Society. He stated that Dr. Binney was desirous, and left directions for the completion of the work, the charge of which was committed to Dr. Gould. It had taken ten years to complete it; but the duty had been nobly and admirably performed, and it was exceedingly gratifying to him to say that it would prove most creditable to the Society and to the country.

Mr. Amos Binney said that ten years might seem a long period for the completion of the work, but any apparent delay was more than sufficiently accounted for by the time occupied in collecting the materials, which, at the decease of his father, were very widely scattered.

Dr. A. A. Hayes exhibited some fragments of iron and bronze vessels from the volcanic ashes of Pompeii, which had repassed from the state of a wrought metal to that of the original ore.

Dr. J. B. S. Jackson exhibited an Intestinal Worm, (*Ascaris lumbricoïdes*,) which was passed from the rectum of a child, with about an inch of its body inserted through the eye of a common dress-hook. He observed that this example illustrated the singular tendency of this worm to crawl through perforations in the intestine, into the duct of the gall-bladder, or into the appendix cœci.

Dr. A. A. Gould presented, in the name of Lieut. Preble, U. S. Navy, a specimen of *Dipsas plicata*, upon the inner surface of which were a number of beautiful elevated pearly figures, representing the god Boodh, produced during the lifetime of the animal, upon nuclei placed within the shell. The following account of the process, by Dr. Magowan of Ningpo, accompanied it: —

The introduction of the pearl nuclei is an operation of considerable delicacy. The shell is gently opened with a spatula of mother of pearl, and the free portion of the mollusc is carefully separated from one surface of the shell with an iron probe; the foreign bodies are then introduced between the points of a bifurcated bamboo stick, and placed in two parallel rows upon the mantle or fleshy surface of the animal. A sufficient number having been placed on one side, the operation is repeated on the other. Stimulated by the irritating bodies, the suffering animal spasmodically presses against both sides of its testaceous skeleton, keeping the matrices in place. This being done, the animals are deposited one by one in canals, streams, or pools connected therewith, five or six inches apart, at depths of from two to five feet, in lots of from five to fifty thousand. If taken up a few days after the introduction of the moulds, they will be found attached to the shell by a membranous secretion, which at a later period becomes impregnated with calcareous matter; and finally layers of nacre are found deposited around each nucleus, the process being analogous to the formation of calculous concretions in animals of a higher development. A ridge of nacre generally extends from one pearly tumor to another, connecting them all together.

About six times in the course of the season several tubs of night soil are thrown into the reservoir for the nourishment of the animals. Great care is taken to prevent goat manure falling in, as it is highly detrimental to the mollusc, preventing the secretion of good nacre, or killing them, according as the quantity is great or small.

In November the shells are carefully collected by hand.

Dr. Storer presented a specimen of the Trumpet Fish, (*Centriscus scolopax*,) caught at Provincetown, the first known to him to have been taken upon this coast. It is common upon the European coast and in the Mediterranean.

Messrs. James G. Shute, of Woburn, and Henry J. Clarke of Cambridge, were elected Resident Members.

April 15, 1857.

Dr. Chas. T. Jackson, Vice-President, in the Chair.

Dr. A. A. Gould announced a bequest to the Society, by the late Professor Jacob W. Bailey, of West Point, N. Y., a Corresponding Member, dated February 11, 1857, communicated in a letter from his brother William M. Bailey, Esq., of Providence, as follows: —

BEQUEST OF PROF. J. W. BAILEY.

" *First.* A microscopic collection, contained in cases resembling books, together with said cases, and the index volumes thereunto belonging; the whole bearing for titles, 'Microscopic Collections.'

" *Second.* The whole of my collection of Algæ, or Sea-weeds, as contained in a set of portfolios, together with said portfolios.

" *Third.* All my rough material for microscopic research, as contained in small boxes, paper, vials, and larger boxes, containing large masses marked with chalk, Richmond, Petersburg, Georgia, Florida, &c.

" *Fourth.* I request said Society to retain the first and second of the foregoing bequests as a part of their collections, as long as said Society shall exist, making such uses as they please of the rough material in the third bequest."

Also, in a codicil, dated February 24, 1857: " A volume containing rough sketches, &c., of microscopic forms, and marked with title, 'Microscopic Memoranda.'"

Also, "All my other microscopic drawings, sketches, or microscopic memoranda, to be kept or destroyed, in any part, at the option of the Society."

Also, "Such of the following books as are not possessed by the Society, viz: Ehrenberg's Microgeologie, and all my other German Scientific Books; also, all my books, pamphlets, &c., relating to Algæ, Diatomaceæ, Microscopic Botany, and Histology; also, Lindley and Hutton's Fossil Flora, and all my other Botanical Books."

Also, "My 'Scientific Letters,' in packages so marked, with the privilege of destroying such as are of no value to the Society, as autographs, &c."

"I desire that my Executor shall stipulate with the Boston Society of Natural History, to which I have made valuable bequests, that such bequests shall be placed in a case or cases by themselves, and that my sons, who may be at college at Cambridge, may have such access to such case or cases, for the purpose of study or examination, as may be consistent with the rules of said Society."

Dr. Gould, after remarking upon the great value of this bequest to the Society, upon its importance to science in the study of microscopic recent and fossil forms, offered the following resolutions, which were unanimously adopted:—

Resolved, That while acknowledging the receipt of the bequest of the late Prof. Bailey, the Society would express its gratification at having been made the depository of collections containing original and authentic specimens of microscopic forms and Algæ, which must ever remain the ultimate and standard objects of reference, in this country, in the study of those subjects; pledging itself to secure, as far as practicable, their preservation, and to make them as extensively useful as possible.

Resolved, That a Committee be appointed to receive and report upon the bequest, and also to execute the expressed wish of Prof. Bailey, that his "bequests shall be placed in a case or cases by themselves."

Resolved, That the request of W. P. Blake, Esq., be granted, desiring that such papers as may be found relating to a Report on the Infusoria of California, may be given up to him for publication, as originally intended.

Resolved, That the thanks of the Society be presented to W. M. Bailey, Esq., for the prompt and complete manner in which he has executed the will of his brother, so far as concerns this Society.

Dr. A. A. Gould, Prof. John Bacon, and Dr. Silas Durkee were appointed the committee referred to in the second resolution.

The following communication was read from Mr. Charles J. Sprague, on the Botanical Position of the Chinese Sugar Cane: —

The plant was called *Holcus saccharatus* by Linnæus; but when this genus underwent a subdivision by subsequent botanists, this species was placed by some in that of *Andropogon*, by others in that of *Sorghum*. These two genera are closely allied. Some of the best authorities consider the differences so slight as to warrant their union into one. Steudel arranges *Andropogon*, *Sorghum*, and *Trachypogon* all under one head — *Andropogon*. Lindley italicises *Sorghum* in the last edition of his "Vegetable Kingdom," and places it beneath *Trachypogon*, evidently considering them equivalent. Dr. Gray retains *Sorghum* for our only native species (*S. nutans*) in his last edition of the Manual, considering the genus a good one.

It is between *Andropogon* and *Sorghum*, therefore, that we must choose in reference to this particular species.

The differences between them are these —

Andropogon.	*Sorghum.*
Inflorescence spicate.	Inflorescence paniculate.
Spikelets in pairs, only one being fertile.	Spikelets in twos or threes, central one only being fertile.
Glumes herbaceous or membranaceous.	Glumes hard, coriaceous or indurated.
Rachis hairy.	Rachis smooth.

If these differences shall eventually render the genera sufficiently distinct to establish a universally recognized separation, then this plant must be placed under that of *Sorghum.*

The specific name is a matter of some doubt. Both *S. vulgare* and *S. saccharatum* are recorded as distinct species; but there is frequently a query appended to the latter. Some of our best authorities incline to the opinion that these two are identical, the differences between them being due to the long cultivation which the plant has undergone. We know that some of the grasses have sported into numerous varieties; and it is very probable that the Broom Corn, Doura or Guinea Corn, and the Chinese Sugar Cane are all descended from one and the same stock.

If we accept this as a fact, then the plant should be called, SORGHUM VULGARE, Pers., *var. saccharatum,* L.; but as the latter name is so extensively known, and as there is still some doubt as to the identity, it may be as well to continue the name *Sorghum saccharatum.*

The true Sugar Cane, *Saccharum officinarum,* belongs to the same tribe of grasses, differing in the ample inflorescence, which is paniculate, and drooping with downy pedicels and florets.

A letter was read from Robert Kennicott, Esq., of Illinois, accompanying a donation of Mammalia, Birds, and Shells. With reference to the Mammalia, Mr. Kennicott says: —

"The *Arvicola austerus* is a prairie animal, and will interest any one studying mammals; the *A. riparius* is pronounced a true species by Prof. Baird. The *Hesperomys Bairdii* is a new species, which will be described by Dr. Hoy and myself soon. It comes near Audubon's and Bachman's *Mus Michiganiensis,* but it is readily distinguished upon comparing the two. I have sent your Society specimens of this species (*Bairdii*) already, under the name of *Mus Michiganiensis*; it is strictly a prairie animal. Dr. Hoy has found *M. Michiganiensis* near Racine, Wisconsin."

Mr. N. H. Bishop presented the following list of Plants, most commonly met with during a pedestrian tour across the continent of South America, from Rosario, on the Parana, to Valparaiso, Chili: —

Bolax, an umbelliferous plant, above the snow on mountains, collected 10,000 feet above level of sea. *Capsicum*, Red Pepper (aji,) very common in the northern parts of the Republic. *Prosopis Algaroba*, White Algaroba, order Leguminosæ; also Black Algaroba is very common. *Portulaca; Verbena*, several varieties; *Loasa, Tropæolum, Alstrœmeria, Chenopodium, Schizanthus pinnatus, Geranium, Lathyrus pubescens, Argemone Mexicana, Œnothera, Lippia, Acicarpha, Quinchamalium, Salpiglossis;* valleys and base of the Andes. *Maloastrum, Supinus;* deserts at the eastern foot of the Andes. *Medicago sativa*, Alfafa, cultivated for cattle; *M. maculata*, weed refused by cattle, the common weed of clover fields. *Scirpus, Solanum;* Lagoon near San Juan, on the desert. *Tessaria absinthoides;* border of lagoon, San Juan, Argentine Republic, October. *Strombocarpa strombulifera*, Screw plant; Traversia, San Luis to the Andes. *Larrea divaricata;* common; Traversia between Mendoza, and San Juan.

Dr. C. T. Jackson gave an account of the Copper Mine, so called, at Elk Run, Fauquier County, Virginia.

The copper is found in strata of the Triassic Age, in trap-dykes coming through Sandstone, containing a little of the yellow and gray sulphuret, and the carbonate of copper, azurite, chrysocolla, and malachite in thin films. Had quartz or carbonate of lime been the gangue-stone, he should have supposed the locality to have been of some economic value. He advised the company not to work it, and afterwards learned that an old mine, in which a shaft had been sunk 150 feet, situated near that place, had been abandoned many years before as unprofitable.

Dr. Jackson made some further remarks in illustration of the view that the rock, through which the trap-dyke comes, exerts an influence upon its metallic contents, and referred to a previous communication to the Society upon this subject. (See report of the Excursion Meeting, printed Proceedings, Vol. VI. p. 24.)

Prof. H. D. Rogers said that Geology was in a state of great confusion as to the nomenclature of the superposition of stratà. He had felt the necessity of introducing some new terms, and he proposed the following, viz : —

1. Conformable Continuous.
2. Conformable Interrupted.
3. Unconformable Continuous.
4. Unconformable Interrupted.

He illustrated the application of the terms by the aid of a diagram, representing three strata—Limestone below, Shale intermediate, and Sandstone the uppermost, designating them by A, B, and C respectively. If we find a partial blending of organic remains, and partial intermingling of materials, with evidence of continuity in time of deposition, this condition may be expressed by the first term. If the strata A and C are together in superposition, without physical sign of break, and yet with abrupt omission in types of life, it should be designated in the second category. If the sequence of the strata is uninterrupted, and yet a displacement exists from some physical disturbance, the third term is applicable. The fourth term would designate C, unconformably upon A, and at the same time an exclusion of B.

The recognition of such distinctive terms would much tend to promote the science of Geology.

Dr. Jackson observed, that amongst other examples of the interrupted series, there is a fine illustration in the superposition of the Sandstones of the Connecticut River, upon the Gneiss, Granites, and Mica-Slate of New Hampshire, at Northfield, Mass.; where the whole Palæozoic Series is wanting.

Dr. Jackson expressed himself in favor of the nomenclature of Prof. Rogers, because it was both explicit and succinct.

The Chairman announced the death of Prof. Michael Tuomey, of Alabama, one of the Corresponding Members of the Society, and requested Prof. W. B. Rogers to propose a resolution suitable to the occasion.

Prof. Rogers, in doing so, said that he had listened with painful surprise to the announcement just made of the death of our associate, Prof. Tuomey. Last summer, when attending the Scientific Association in Albany, his apparently vigorous frame and look of quiet enthusiasm, gave promise of many more seasons of productive geological toil. Of the early life of Michael Tuomey, Prof. Rogers said he knew nothing, farther than that he was, he believed, a native of Ireland, and coming to this country quite young, became first a resident of the State of New York. As a cultivator of science, he early attracted notice by his study of the Tertiary deposits of the neighborhood of Petersburg, in Virginia, where for some years he resided in the capacity of a teacher. After this he was appointed to conduct the Geological Survey of South Carolina, and having completed the work as far as practicable with the means at his command, published, in 1848, a Report on the Geology of the State, which proved highly acceptable to geologists as well as useful to the community for whose practical benefit it was designed.

Soon after this, Prof. Tuomey was elected to the Chair of Geology and Natural History in the University of Alabama, and placed at the head of the State Geological Survey then organizing; in which truly interesting field he has ever since been steadily and actively employed. His paleontological studies in the Tertiary and Cretaceous deposits of the Southern Atlantic States proved a valuable introduction to the examination of those groups of formations as they are developed in middle and southern Alabama; and we cannot doubt that had he lived to complete the survey, his additions to this branch of our geology, as well as his investigation of the structure and paleontology of the older rocks overspreading the northern part of the State, would have formed an important contribution to our knowledge of that rich and varied portion of our great geological field. His partial Reports of the Survey, of which two or three have been published, although intended mainly to indicate the progress of the work, contain many valuable details; but of the nearness of the survey to its completion, and of the extent and character of the materials in reserve for a final Report, Prof. Rogers was without the means of judging. He could only say, that from the great richness of this part of the geological field, and the known industry and ability of Prof. Tuomey, we had reason to anticipate from it much interesting matter, especially in the department of Paleontology.

Besides his occasional descriptions of fossils from the Tertiary deposits, Prof. Tuomey had of late, in conjunction with Prof. Holmes of South Carolina, been engaged in publishing in quarto numbers a work on the "Fossils of South Carolina," which for the excellence of its material, and the faithfulness and beauty of its illustrations, may very favorably compare with any similar work published in this country.

Prof. Rogers then offered the following resolutions, which were unanimously adopted: —

Resolved, That we have heard with unfeigned regret of the death of Prof. Tuomey, of Alabama, an event which deprives the geologists and naturalists of our country of a zealous and active associate, whose labors had already won for him an honorable place among our scientific explorers, and whose knowledge and experience, in connection with the important survey in which he was engaged, gave earnest of still more extensive and valuable contributions.

Resolved, further, that we offer to the family and friends of the deceased an expression of our sincere regret and sympathy.

Prof. William B. Rogers having asked permission to make a few remarks in relation to the scientific services of the late William C. Redfield, proceeded as follows: —

Since the opening of the present year, the cultivators of science have been called on to lament the loss of two of their distinguished co-laborers, on this side the Atlantic, William C. Redfield, of New York, and Prof. Bailey, of West Point, the former eminent for his researches on the subject of storms, the latter for his microscopical discoveries. Our Society, claiming Prof. Bailey as one of its most valued members, has already accorded an appropriate memorial to his genius, labors, and virtues. We have also had the satisfaction of numbering Mr. Redfield among our associates, and we are all familiar with his reputation as a man of science, and some of us have known him as a friend. Feeling, therefore, the loss which the community of science, especially in this country, have sustained in his death, we may not inappropriately claim a share in the general and deeply felt regret occasioned by this event, by placing on our records a brief tribute to the scientific worth and manly excellences which marked his career.

Mr. Redfield, it is stated, was but little favored in early life by opportunities of education. Even after his removal from his native State, Connecticut, to the city of New York, while yet a young man, he became immersed in business occupations such as are commonly thought incompatible with purely intellectual pursuits, and which in most cases leave but little leisure and still less disposition for the studies and investigations of science. But his strong inclination for scientific inquiries was not to be repressed by these discouragements, and he early enrolled himself among the active students of Meteorology, Physical Geography, and Geology.

In the first of these departments, which it is well known was the principal field of his investigations, his patience and sagacity in observing facts, and in collating and comparing the observations made by others, bore their rich fruit in that remarkable generalization which, under the title of the *Rotary Theory of Storms*, is so commonly associated with his name. His earliest recognition of this law appears to have been suggested by the phenomena of the violent storm which, in the year 1821, swept over New England; and it is not a little remarkable that it was a storm occurring the same year in Central Europe which led the German Meteorologists into a similar train of inquiry, and conducted Prof. Dové, of Berlin, to a theory founded like that of Mr. Redfield on the union of a progressive with a rotary movement of the disturbed column of air.

It must not, however, be supposed that the fact of a revolving motion in some of the more violent storms had hitherto entirely escaped observation. Long before these systematic inquiries were thought of, navigators had recognized such a movement in some of the storms within the Tropics. As far back as 1680, Capt. Langford, in a paper on West Indian hurricanes, printed in the Philosophical Transactions, described them as progressive whirlwinds; and at the beginning of the present century, Col. Capper, Mr. Horsburg, and a French writer, Romme, speak of the hurricanes or typhoons of the India and China seas as revolving storms. But these early observations and suggestions, pointing chiefly to local phenomena, and involving no clear conception of a general law, attracted little notice at the time of their publication, and were almost, if not entirely forgotten when Redfield and Dové, without a knowledge of each other's labors, framed the great generalization of the progressive-rotary character of these atmospheric movements. Without detracting from Prof. Dové's share in the investigation, it must, I think, be admitted, that to Mr. Redfield is preëminently due the credit of having first given to this law a truly inductive character; and I need hardly add that his analysis, year after year, of the data diligently collected by him, was a work involving no small amount of detailed labor, as well as of sagacity and skill.

Although his investigations were directed principally to the storms of the Atlantic north of the Equator, he was early led on theoretical grounds to announce the proposition that in the southern hemisphere the motion of storms is the reverse of that presented by them in the northern one, both as regards progression and rotation. This statement was soon after confirmed by Col. Reid, the author of the well-known work on the Law of Storms, in an elaborate investigation of those of the Southern Indian Ocean.

These important generalizations in the discovery and development of which Mr. Redfield so largely shared, although not universally accepted either at home or abroad, have been adopted by most of those who have devoted themselves to the practical study of the subject, and in particular have been advocated with much ability by Col. Reid, already named, and by Mr. Piddington, author of the "Sailor's Horn-book for Storms," to both of whom we are indebted for extensive researches in this branch of Meteorology. Through the treatises of these gentlemen, and the numerous memoirs of Mr. Redfield, this theory is rapidly becoming familiar to the minds of navigators, many of whom have not only accepted but practically applied it. Even the general public have learned its language and its leading features, from the accounts of cyclones or revolving storms, so often repeated in the current news. It is but proper to add that the evidence in favor of this law has lately received an important accession from the publication by Mr. Poey of Havana, of a tabular description of the gales of the West Indies and Atlantic, in which their progressive rotary character, and the opposite directions of the movement on different sides of the equator is shown by an investigation of between three and four hundred distinct storms, extending over a period of about the same number of years.

How far these laws are applicable to other than ocean storms, and what new laws or modifications of the rotary principle may obtain in the interior of continents, are questions which do not seem at present capable of a satisfactory answer. But however they may be decided by future investigations, we cannot, I think, fail to recognize in the generalizations of Redfield and his co-workers a valuable contribution to positive knowledge, and an induction which, even should it be found strictly applicable only to the oceans and their coasts, is fraught with great practical good as well as scientific interest.

In saying thus much, I would not be considered as accepting the theoretical views which Mr. Redfield from time to time suggested in explanation of the origin of the revolving and progressive motion which he labored to demonstrate. These speculations rarely put forth, and never very strenuously urged, appear to have had but little interest for him in comparison with the establishment of the *law of the phenomena.* Indeed, they were so briefly, and I must in candor add, so indistinctly presented, as to attract but little attention from the scientific world. At the same time it should be considered that even had Mr. Redfield possessed a philosophical inventiveness and a command of the exact sciences beyond what we would claim, or his own modest self-appreciation would admit as his, we could hardly have hoped that, in the present stage of investigation, he could have furnished a really satisfactory solution of the complex problem of the dynamics of storms. His labors, together with the concurring or the conflicting views of other Meteorologists at home and abroad, mark a great and beneficent progress in this difficult inquiry, and encourage the hope that, along with a knowledge of the laws of the winds, we shall hereafter be able to grasp in our thoughts the mode of their origin and the physical forces by which they are produced.

While giving his chief attention to the development of the Law of Storms, Mr. Redfield found time for many useful observations in geology, especially in relation to the fossil fishes of the so-called New Red Sandstone belt of New Jersey and Connecticut, as well as those of the coal rocks of Eastern Virginia. In this inquiry, he had the valuable assistance of his son, Mr. John H. Redfield, to whom we are indebted for descriptions and figures of several of these interesting fossils, as well as for important suggestions, founded on zoölogical affinities, as to the age of the belt of rocks in which they are entombed.

The continuation of this work had long, I believe, been a favorite plan with Mr. Redfield, and seems to have been one of the last subjects connected with scientific pursuits which engaged his attention; for on his visit to Boston in the autumn, he spoke with much interest of having resumed the task of preparing, with the help, I think, of Prof. Agassiz, a comprehensive monograph of the fossil fishes of this group of strata. But alas, on the 12th of February, he was called on to relinquish this and all other labors. He died at the ripe age of 68 years, but with faculties unimpaired, leaving us to regret that he could not have lived to continue his useful career, and yet giving us, in what he had done, cause to rejoice that he was permitted to work so long and so successfully in extending science and promoting the interests of mankind.

Such is a slight notice of the scientific labors of Mr. Redfield. The esteem in which they are held is best proved by the honorable rank to which they raised him among the cultivators of positive science. Of his character as a gentleman, whether in society, or presiding at a meeting of the American Association of Science, I would gladly speak were it in my power to depict the gentleness and modesty of his discourse, and that union of amiable and manly qualities which won the affection and respect of so many of his associates in scientific pursuits. But I must leave such a tribute to other and more competent hands, and will now bring my remarks to a close by asking the Society to adopt the following resolutions: —

Resolved, That the late William C. Redfield, by his sagacity and patience in philosophical researches, and by the importance of the conclusions which he assisted in demonstrating, has reflected honor upon the progressive science of our country, and earned a title to the lasting recollection of his scientific brethren, and, *Resolved*, further, that, in recording this mark of our regard for his memory, we would tender to his family and friends an expression of our deeply felt regret and sympathy.

The resolutions were unanimously adopted.

The Chairman announced that the next meeting would be the regular Annual Meeting for the election of Officers, and Reports of Curators, and other business.

Dr. A. A. Gould, Mr. James M. Barnard, and Dr. J. B. S. Jackson were appointed a committee to nominate officers for the ensuing year.

ANNUAL MEETING.

May 6, 1857.

Dr. C. T. Jackson, Vice-President, in the Chair.

The records of the last meeting and of the last annual meeting were read and approved.

The Treasurer, Librarian, and the several Curators presented their Annual Reports, which were read and accepted.

Messrs. James M. Barnard and Charles J. Sprague were appointed to audit the accounts of the Treasurer.

The Committee appointed to nominate officers for the ensuing year, reported a list of candidates, and the report was accepted. The following gentlemen were duly elected officers, viz : —

President,

Jeffries Wyman, M. D.

Vice-Presidents,

Chas. T. Jackson, M. D. D. H. Storer, M. D.

Corresponding Secretary,

Samuel L. Abbot, M. D.

Recording Secretary,

Benj. Shurtleff Shaw, M. D.

Treasurer,

Nathaniel B. Shurtleff, M. D.

Librarian,

Charles K. Dillaway.

Curators,

Thomas T. Bouvé,	*Of Geology.*
John Bacon, M. D.	*Mineralogy.*
Charles J. Sprague,	*Botany.*
Thomas M. Brewer, M. D.	*Oölogy.*
Henry Bryant, M. D.	*Ornithology.*
Thomas J. Whittemore,	*Conchology.*
J. Nelson Borland, M. D.	*Herpetology.*
Silas Durkee, M. D.	*Entomology.*
Nathaniel E. Atwood,	*Ichthyology.*
Theodore Lyman,	*Crustacea and Radiata.*
John Green,	*Comparative Anatomy.*

Cabinet Keeper,

Charles Stodder.

Dr. J. N. Borland presented the following list of Reptiles collected in California, by Mr. E. Samuels, viz: —

CHELONIANS. Family—Elodites.

Emys marmorata. Baird and Girard, Proc. Ac. Nat. Sci. Philad. Oct. 1852, vol. 6, p. 177.

OPHIDIANS. Family—Crotalidæ.

Crotalus lucifer. Baird and Girard, Proc. Ac. Nat. Sci. Philad. Oct. 1852, vol. 6, p. 177.

Family—Colubridæ.

Eutainia ordinoides,	B. & S.	Cat.	N. Am.	Rep. Pt. 1.	p. 33,	1853
Bascanion vetustus,	do.	do.	do.	do.	97,	do.
Contia mitis,	do.	do.	do.	do.	110,	do.
Ophibolus Boylii,	do.	do.	do.	do.	82,	do.
Diadophis amabilis,	do.	do.	do.	do.	113,	do.
Pituophis Wilkesii,	do.	do.	do.	do.	71,	do.

SAURIANS. Sub-family—Chalcidien.

Gerrhonotus multicarinatus, Blainville, Nouv. Ann. du musèe d'histoire naturelle, tome 4, 1835, Pl. 25, fig. 2.

Sub-family—Lepidosaurien.

Plestiodon Skiltonianum, B. & G., Stansbury's Report to Congress of Exploring Expedition to Utah, p. 349, Pl. 4, fig. 4–6.

Sub-family—Eunotes.

Sceloporus occidentalis, B. & G. Proc. Ac. Nat. Sci. Phil. vol. 6, p. 175, 1852.

BATRACHIANS. Sub-order—Anoures.

Rana longipes described as *nigricans,* Hallowell, Proc. Ac. Nat. Sci. Phil. vol. 8, p. 96, 1854.

Hyla regilla, B. & G. Proc. Ac. Nat. Sci. Phil. vol. 6, p. 174, 1852.

Sub-order—UroDELA.

Taricha torosa, Gray, Cat. Rept. in British Museum.

Taricha laevis, B. & G. Proc. Ac. Nat. Sci. Phil. vol. 6, p. 302, 1853.

Aneides lugubris, B. & G. Proc. Ac. Nat. Sci. Phil. vol. 4, p. 126.

Heredia Oregonensis, Ch. Girard, Proc. Acad. Nat. Sci. Phil. vol. 8, p. 235, 1856.

Batrachoseps attenuata, S. F. Baird, Journ. Acad. Nat. Sci. Phil. vol. 1, p. 288, 1849.

Ambystonia Californica, Gray, Cat. Rept. in Brit. Mus.

Dr. A. A. Gould, in behalf of the committee appointed to receive and report upon the Bequest of Professor Bailey, submitted the following report, which was accepted.

The Committee appointed to receive and report upon the Bequest of the late Prof. Bailey, have attended to their duty, and state the following results :—

The examination of the Books, Drawings, and Correspondence was submitted to the Chairman—the Microscopical Collection to Dr. Bacon—the Algæ and preparations of organic tissues to Dr. Durkee.

In presenting the Report, the order in which the several bequests are specified will be followed.

I. The Microscopical Collection. Dr. Bacon's Report, (A.)

The *Microscopic Collection*, which comprises the most valuable portion of the specimens mounted for the microscope, is contained in twenty-four boxes in the shape of octavo volumes.

Five of the boxes contain specimens of Diatoms, &c. from the Atlantic Soundings, including two boxes from Lieut. Berryman's Soundings between America and Ireland in 1856.

Three boxes contain specimens from Soundings in the Arctic and Pacific oceans, Gulf of Mexico, and Para River, &c. in S. America.

In four boxes are American and Foreign Diatoms ; Diatoms in Guano ; and Fossil Polycistins and Diatoms from Barbadoes.

In three boxes are Fossil Diatoms from Virginia and Maryland; Bermuda; Monterey, California; Suisun Bay, &c.

Nearly all the specimens in the above boxes were mounted by Prof. Bailey; and they are accompanied by manuscript catalogues, or by memoranda on slips of paper, in which the positions of more than three thousand individual objects on the slides are noted with reference to Bailey's Universal Indicator for Microscopes; thus enabling the actual specimens described by him to be readily found and identified at any future time. A part of the Collection is also accompanied by an alphabetic catalogue of species, with references to the slides on which specimens may be found.

Two boxes contain recent and fossil Vegetable Tissues; and two others Test Objects and miscellaneous Organic Bodies, and a micrometer scale on a glass slide.

The number of glass slides in these twenty-one boxes is five hundred and fifty.

In addition to the selected specimens in the *Microscopic Collection*, there are more than eight hundred specimens mounted on glass slides, comprising many duplicates of those in the Collection, and a variety of miscellaneous microscopic objects.

There are also two hundred specimens of Polythalamia mounted as opake objects and labelled. These are not duplicates of the Polythalamia in the *Microscopic Collection*, which are in Canada balsam.

A very valuable portion of the bequest consists of the original specimens of microscopic material, collected by various scientific and exploring expeditions, and an extensive series of specimens received from European correspondents, including Ehrenberg and other distinguished microscopists.

Among the miscellaneous objects are three microscopic daguerreotypes, seven photographs on paper, nineteen drawings of microscopic objects, and two micrometer scales on small slips of glass.

II. The ALGÆ, &c. Dr. Durkee's Report, (B.)

These are contained in thirty-two portfolios. They are from almost every part of the globe. They are arranged and named in a manner to afford great assistance to the student, who may be interested in the study of Marine Botany. In most instances, specimens of the same kind, but collected at different seasons of the year, or brought from different localities, and presenting different appearances to the naked eye, are placed side by side, upon the same sheet or within the same envelope, so that the work of comparing one specimen with another, and of ascertaining the names of doubtful ones, which the student may possess, is rendered easy. And the fact, that very many of the specimens are those originally described, and that nearly every plant in the collection has attached to it the name of some distinguished algologist, as Bailey, Harvey, Binder, or Jolit, stamps upon it an important value. It makes it a type specimen.

Upon the cover of each volume is an index of what is contained within; that is, a synopsis of the series, sub-series, order or family, to which the enclosed specimens belong; and even the individual names of the plants are written on the outside.

The family of Florideæ are the most numerous, and embrace nearly one half of the whole collection. They are contained in fifteen portfolios.

The Diatomaceæ are in one volume, and amount to four hundred and twenty-five.

The whole number in the collection is about four thousand five hundred. Of this number about two hundred varieties belong to the Florideæ.

The Committee have not had time to enter into further particulars respecting this magnificent collection of Algæ. Its value is beyond all price. It raises the department of Marine Botany to a prëeminent position in our Cabinet. We hazard nothing in saying that no collection of the kind in the country is equal to it, and but few in Europe superior to it.

The animal tissues are contained in the boxes or Nos. marked 4, 5, 6.

No. 4, contains the tissues of some of the Vertebrata.

No. 5, the tissues of some of the Articulata.

No. 6, the tissues of some of the Mollusca and Radiata.

The whole number in the three boxes is sixty-nine; all in good order excepting one. The slide containing this specimen is broken.

III. The Books. The whole number of bound volumes is eighty-four, besides one hundred and fifty unbound volumes and pamphlets, and these latter are not the least valuable portion of the Library, consisting as they do of important monographs, a form in which much that has been done in Algology and Microscopy is as yet only to be found. Among the works are the splendid Microgeologie of Ehrenberg, the works of Kützing, Queckett, Ralfs, Hassall, Smith, Agardh, Harvey, Lindley, and Hutton. Indeed, nearly every thing of importance relating to his favorite studies is here; and they are rendered additionally valuable by important notes of his own.

IV. The volume containing rough sketches of microscopic forms and marked "Microscopic Memoranda," is a most interesting volume. It consists of letter-sheets of sketches made by means of the camera lucida, under the microscope, or of more finished drawings on glazed cards and arranged on sheets. At the end is an alphabetical catalogue of the several objects delineated. There are four hundred and fifty sheets, and seven hundred different objects named in the catalogue. Of most of these, numerous attitudes are given, so that the whole number of sketches is probably not less than three thousand, and they are highly valuable as an illustrative accompaniment to the microscopical collection. They are all characteristic and instructive, and many of them exquisitely done. They date as far back as 1838—twenty years ago—and being chronologically arranged, afford a graphic diary of the train of Prof. Bailey's investigations, as well as of his own wanderings; for wherever he went his microscope or his collecting boxes and bottles went with him. From Quebec to Florida we trace out all his abiding-places during his vacations.

This collection is curious as it shows how he was gradually led into the study of microscopic organic forms. His first observations were of vegetable structure—then we have an Echinorhynchus—the ovipositor of an ephemera, &c. In January, 1839, in examining some aquatic plants he perceived a curious body, the nature of which he could not make out; it afterwards proved to be a Gomphonema. This excited his curiosity in that direction, and his sketches of common Diatomaceæ soon became frequent. March 11, 1839, he sketched an organism which Ehrenberg subsequently named Stauronema Bayleyi. In 1843, his observations had become so numerous that, at the meeting of the Association of Geologists and Naturalists in Boston, he communicated his paper entitled, "Sketch of the Infusoria of the family Bacillariæ, found recent or fossil in the United States," extending to fifty pages and illustrated by figures ; a paper which attracted much attention everywhere, and placed him at once in the highest rank as an investigator of microscopic forms.

The volume is also instructive in showing how much industry and enthusiasm—what a patient and gradual accumulation of numberless facts—how many trials, and doubts, and difficulties a man must always surmount in arriving at solid fame and true eminence.

V. The Scientific Letters, which he submitted to the Society to retain such as might be deemed desirable for autographs or otherwise, and destroy the remainder at discretion, your Committee have found very interesting, and consider that, with very few exceptions, they ought to be preserved. In addition to every man of scientific note in this country, he numbered among his correspondents all the most noted Microscopists and Algologists in Europe, such as Ehrenberg, Kützing, Queckett, Harvey, Greville, Smith, Williamson, Ralfs, Agardh, De Brébisson, Montagne, Le Normand, and very many others. Their letters contain many interesting facts and discussions, and even now many of them contain drawings and specimens as they were sent, and which the Committee think should be transferred to their appropriate places. The history of Microscopy and Microscopists in this country, can never be so well learned elsewhere as from these letters. Indeed, time always renders the correspondence of original investigators of curious interest and of real value. As an index of the varied acquirements and world-wide reputation of our departed benefactor, we think they should be preserved. The thousand and one inquiries which were made of him respecting Microscopes—the little packages sent him by hundreds from beginners that they might be named, "if it would not be taxing him too much," show how much of his time he must have sacrificed, as every man of mark in science is called upon to do, to good nature, and to tasks that were profitless and vexatious so far as his own advancement is concerned.

The Committee would recommend that a selection should be made of such as contain valuable scientific facts, and that these be arranged alphabetically and bound; the remainder to be kept in bundles, as they now are.

In conclusion, the Committee would congratulate the Society in having been made the recipients of scientific treasures so rich and so rare. It becomes us to insure their preservation, and to make them profitable. In bestowing them here, he no doubt expected a better use would be made of them here than elsewhere. He was of too practical a turn to be satisfied with mere storage. He anticipated that some one would take up the subject where he left it, make himself familiar with the collection, be able to refer to the individual objects of it, and to answer such inquiries as other investigators might seek to have settled from it. What a glorious opportunity for one or more young men of leisure and scientific tastes. Every thing which has been collected in this country relating to the Algæ and to Microscopic forms is here embodied, together with all the books necessary for the study and further pursuit of those branches. Whoever shall make himself master of them must be the ultimate authority for America. Such an opportunity for distinction even Ehrenberg never had. Who shall be the man?

We would not close without one word of tribute to the memory of our benefactor. We knew him to be a man of conscience, amiable in his whole character, and of the highest order among men of science. But the revision of his labors has tended to raise him still higher in our admiration. He is an eminent example of what may be accomplished by constant application, and of the confidence which one may inspire in his fellow-men by unwavering truthfulness. In the very prime of life, with all the necessary outlays and appliances for extensive and rapid strides in knowledge, it seems too great a loss to be submissively acquiesced in. We cannot refrain from quoting, as expressive of our own estimate of his worth and position, from the letter of one who could appreciate him justly.

"I had seen that you are President of the Montreal meeting (Association for Science) next year. I am sure every one acquainted with what you have done for the advancement of science, American science and American scientific character, will say, that no appointment at the present time could be more appropriate or just. My dear sir, I hope the great Disposer of events, whose minute works you have done so much to place before our eyes in all their exquisite beauty of form, of workmanship, and of adaptation, will give you yet many years to enjoy the honors you have so honestly acquired, and to add many more discoveries to those you have already secured."

At the last meeting, no distinct Resolution having been passed touching one of the stipulations accompanying the bequest of Prof. Bailey, the following was offered and unanimously adopted.

Resolved, That the sons of Prof. Bailey have access to the books and specimens bequeathed by him, and be allowed to use them at their own pleasure; that they also have the same use of the library and cabinet of the Society as members; and, that in consideration of his priceless contributions, their names be placed on the list of Patrons.

Dr. A. A. Hayes read a paper upon the kind of sugar developed in the Sorghum saccharatum, or Chinese Sugar-Cane, as follows:—

The introduction of this interesting plant has led to many somewhat extravagant suggestions, in relation to its future bearing on the agriculture and commerce of our country, particularly in relation to its produce of sugar. I have therefore deemed it a subject worthy of chemical observation and experiments, to determine its claims as a sugar producer; and have also chosen it to illustrate a uniformity of vegetable secretion, according with well-known natural laws. In order to give scientific precision to the remarks which follow, it is necessary that a brief definition of the term sugar, should be given. So rapidly has chemical science progressed of late, that this well-known term has now become a generic name for a class of bodies, individually presenting us with the most marked diversities of sensible characters and composition. We have sugars which are sweet, others which are slightly sweet, and some destitute of sweetness: some are fermentable, others do not undergo this change: some are fluid, more are solid.

In connection with the present subject, adopting cane sugar as the most important kind commercially, and as an article of food from certain inherent qualities, if we examine into its sources, we find them abundant, but not numerous. So far as observation has extended, its production by a plant is definite; a change of locality, even when accompanied by a marked change in the habit of the plant, does not alter essentially the nature of the sugar it produces. Thus the cane of Louisiana rarely matures and is an annual, while in the soil and climate of Cuba, it enjoys a life of thirty, or even sixty years. The juice of our southern plant always contains more soluble alkaline and earthy salts than is found in the cane of Cuba, but its sugar is secreted as cane sugar. The juice of the sugar beet, of watermelons, and a large number of tropical fruits, the sap of the maple and date palm, afford cane sugar. In these juices and saps, when concentrated by desiccation in the cells of the plants, it always appears in regular, brilliant crystals, of a prismatic form, clear and colorless; distinctly indicating a vital force in the plant, separating it from other proximate principles and leaving it in its assigned place pure.

The class of sugars next in importance, includes under the general term Glucose, a number of sugars having varied characters, which should be separately grouped. Among them are the sugars of fruits, seeds, and grasses: those produced in the animal system, and the artificial sugars made from starch, grains, and sawdust. The varieties of glucose are both solid and semifluid. When solid they present aggregates of sub-crystalline form, in which the organic tendency to rounded surfaces, is generally seen. The semifluid forms often manifest a disposition to become solid on exposure to air, and they then experience a molecular change, which produces crystals having new relations to polarized light and different physical and chemical characters.

It is unnecessary to enter more minutely at this time, into a description of each variety of glucose, for the individuals of the class are easily distinguished from each other, and most clearly and remarkably from cane sugar. The plants producing the natural glucose sugars, mature their cells as perfectly as those producing cane sugar, and the secretion can be found as distinctly isolated from other principles as cane sugar is; even when the glucose is semifluid. Hence we are able to determine by microscopical observations, aided by chemical tests, the presence and kind of sugar in the tissues, or sap of a plant, often without incurring the risk of change of properties through the chemical means adopted for withdrawing the sugar.

We have the authority of our associate, Mr. Sprague, for the conclusion, that the *Sorghum vulgare*, or saccharatum, belongs to the tribe including grasses, and we should therefore expect to find its saccharine matter the variety of glucose called sugar of grasses or fruit sugar. The unsuccessful attempts made to crystallize sugar from the juice of the Sorghum, produced in different climates of our country last year, indicated that it contained no cane sugar, or that the presence of some detrimental matter in the expressed juice, destroyed the crystallizable character of cane sugar, as can be artificially done. My observations commenced after I had obtained several specimens of the Sorghum, and have been continued on the semifluid sugar, likewise from different parts of the United States, with uniform results.

When a recent shaving of the partially dried pith of the matured stalks of the Sorghum, is examined by the microscope, we observe the sugar cells filled with semifluid sugar. After exposure to air it is often possible to distinguish some crystalline forms in the fluid sugar. These grains, after being washed, cease to present a clear crystalline character, and have the hardness and general appearance, *of dry fruit sugar.* By withdrawing the sugar without the aid of water, it is possible to obtain it colorless and neutral, as a semifluid glucose or fruit sugar, and no traces of crystals or crystalline forms can be seen. The glucose thus obtained, freely exposed to air, soon undergoes the molecular change which is exhibited by sugar of grapes, and we thus observe another character associating the whole product, with the sugar of grasses and fruits. Leaving the physical observations, and substituting the more exact processes of the laboratory, I found that the semifluid sugar of the Sorghum did not blacken in sulphuric acid, but was sensitive to the action of alkalies, and reduced the alkaline solution of tartrate of copper, thus conforming to the well-known characters of glucose. The most careful trials I could make, failed in detecting cane sugar in any samples of the Sorghum stalks, or in the samples of sugar, including one made by Col. Peters in Georgia, prepared under the most careful management. I must therefore conclude, *that the Sorghum cultivated in this country does not secrete cane sugar or true sugar; its saccharine matter being purely glucose in a semifluid form.*

As a matter of science this result is interesting, in showing the integrity of character pertaining to the genus in which this plant is botanically placed; the sweet grasses yielding fruit sugar, while the maize produces cane sugar only.

In its economical bearings we might wish that the sorghum secreted cane sugar, for the values of cane sugar and glucose are very different. From the best authorities we learn that the power of imparting sweetness in cane sugar, is between two and one half and three times as great as that of dry glucose, and the semifluid sugar of the Sorghum containing water, nearly four pounds of this will be required, to equal one pound of sugar in ordinary use. As a raw material for the production of spirit, for which it seems well adapted, the glucose of the Sorghum may prove valuable, and as an addition to a forage crop, the plant may be found to possess a high agricultural importance.

Dr. John Bacon made a statement confirmatory of the results arrived at by Dr. Hayes. He was unable to obtain any crystals of cane sugar.

The Chairman, Dr. Jackson, said he had obtained crystals by evaporation of the syrup over sulphuric acid: whether they were of cane or grape sugar he could not say. Cane sugar had been found in the plant by European chemists. He had made extensive investigations into its chemical properties and economic value, for the United States Government, which would be published in the Patent-Office Report.

Mr. N. H. Bishop exhibited some of the seed of the Chinese Sugar-cane, and remarked that it was imported from France and not China, as might be supposed. It was estimated by seedsmen that ten tons would be sold in Boston this season for planting, and that one pound would plant an acre.

Mr. N. H. Bishop presented a male and a female Burrowing Owl, (*Athene cunicularia*,) from South America, and read the following paper upon this bird :—

THE BURROWING OWL OF SOUTH AMERICA. (*Athene cunicularia.* MOLINA.)

I first met with this bird on the banks of the River San Juan, in the Banda Oriental, one hundred and twenty miles west of Montevideo, where a few pairs were observed devouring mice and insects during the daytime. From the river, travelling westward thirty miles, I did not meet a single individual, but after crossing the Las Vacas, and coming upon a sandy waste covered with scattered trees and low bushes, I again met with several.

Upon the pampas of the Argentine Republic they are found in great numbers, from a few miles west of Rosario, on the Parana, lat. 32 deg. 56 min. south, to the vicinity of San Luis, where the pampas end and a travesia or saline desert commences.

On these immense plains of grass it lives in company with the bizcacha, (*Lagostomus trichodactylus*, Brookes,) an animal that bears resemblance to the rabbit and agouti, and undermines a great extent of country with its burrows. The habits of this owl are said to be the same as those of the species that inhabits the holes of the marmots upon the prairies of western North America, and one writer speaking of the latter bird remarks, " We have no evidence that the owl and marmot habitually resort to one burrow ; " and Say adds, " that they were either common though unfriendly residents of the same habitation, or that our owl was the sole occupant of a burrow acquired by the right of conquest." In this respect they differ from their South American relatives, who live in perfect harmony with the bizcacha, and during the day while the latter is sleeping, a pair of these birds stand a few inches within the main entrance of the burrow, and at the first sound, be it near or distant, they leave their station and remain outside of the hole, or upon the mound that forms the roof of the domicile. When man approaches, both birds mount above him in the air and keep up the alarm note, with irides dilated, until he passes, when they quietly settle down in the grass, or return to their former place.

While on the pampas I did not observe these birds taking prey during the daytime, but at sunset the bizcachas and owls leave their holes and search for food, the young of the former playing about the birds, as they alighted near them. They do not associate in companies, there being but one pair to each hole, and at night do not stray far from their homes.

In speaking of the North American burrowing owl, a writer says that the species suddenly disappears in the early part of August, and also that it is strictly diurnal. The *Athene cunicularia* has not these habits; it does not disappear during any part of the year, and it is both diurnal and nocturnal, for though I did not observe it preying by day on the pampas, I noticed that it fed at all hours of the day and night on the north shore of the Plata, in the Banda Oriental.

At long. 66 degs. west, our caravan struck the great saline desert that stretches to the Andes, and during fourteen days' travel on foot, I did not see a dozen of these birds. While residing outside the town of San Juan, at the eastern base of the Andes, I had an opportunity to watch their habits in a locality differing materially from the pampas.

The months of September and October are the conjugal ones, and during the middle of the former month I obtained a male bird with a broken wing. It lived in confinement two days, refusing to eat, and died from the effects of the wound. A few days later a boy brought me a female owl, with five eggs, that had been taken from her nest, five feet from the mouth of a burrow that wound among the roots of a tree. The female bird was fierce in her cage, and fought with her wings and beak, uttering all the while a shrill prolonged note, resembling the sound produced by drawing a file across the teeth of a saw. I supplied her with eleven full-grown mice, which were devoured during the first thirty-six hours of confinement.

My object was to discover if this bird burrowed its own habitation, and my observations of eight months failed to impress me with that belief. I have conversed with intelligent persons who have been familiar with their habits, and never did I meet one that believed this bird to be its own workman. It places a small nest of feathers at the end of some deserted or inhabited burrow, as necessity demands, in which are deposited from two to five white eggs, little larger than the domestic pigeon's. In the Banda Oriental, where the country is as fine, and the favorite food of the owl more plentifully distributed than upon the pampas, this bird is not common compared with the latter locality. The reason is obvious. The bizcacha does not exist in the Banda Oriental, and consequently these birds have a poor chance for finding habitations.

On the pampas, where thousands upon thousands of bizcachas undermine the soil, there, in their true locality, the traveller finds thousands of owls. Again, along the bases of the Andes, where the bizcacha is rarely met with, we find only a few pairs. Does the hole from which this specimen was obtained, dug among the roots of a tree, appear to be the work of a bird or quadruped? The several works that I have consulted do not in one instance give personal observations relative to the burrowing propensities of this owl, from which fact it will be inferred that it never has been caught in the act of burrowing.

Dr. Hayes presented, in the name of R. H. Eddy, Esq., some specimens of Native Borate of Lime from South America. They varied in size, were of a dirty appearance externally, but internally beautifully white and silky, and exhibited a tendency to crystallization. The thanks of the Society were voted for the gift.

It was voted that during the summer months the meetings should commence at 8 o'clock P. M.

May 20, 1857.

Dr. C. T. Jackson, Vice-President, in the Chair.

In the absence of the Secretary, Mr. C. C. Sheafe was chosen Secretary *pro. tem.*

Dr. Silas Durkee read a paper on the method by which the common Earth Worm (*Lumbricus terrestris*) finds its way into vessels, such as tubs, barrels, pails, &c., and about the eaves and gutters of houses and sheds, which subject has occasionally been a topic of discussion at the meetings of this Society.

It is well known that after a shower of rain, upon a warm summer's day, the lumbricus is frequently found in the places above named; but by what means they arrive there is the question. Dr. Durkee had recently had an opportunity of watching some earth worms which were placed in glass jars standing in his office. At first there was a small quantity of water in the bottom of the jar, which seemed to prevent them from ascending any great distance; but upon removing this they were repeatedly seen mounting along the sides of the vessel. The progression was at a more moderate rate, and by shorter strides or stages, when they attempted to climb in a vertical direction, than when their course was more inclined. In some instances they reached the top of the vessel, a distance of eighteen inches in eight minutes. Generally their wanderings were quite irregular and circuitous, and they continued on the sides of the glass sometimes for the space of two hours, a part of the time in motion and a part of the time at rest. The worms drag themselves along by a few of their segments at a time, and the number of segments in motion at any one moment is less in their ascending course than when a horizontal or downward direction is taken. The abundant glutinous secretion with which they are covered, together with their numerous setæ and segments, seems well adapted to aid them in their various motions.

The following paper on the Zonda Wind, was read by Mr. N. H. Bishop :—

At a former meeting of the Society, I offered some remarks relative to this peculiar wind. (See Proceedings, vol. vi. p. 126.) I now request the favor of offering some additional observations upon this peculiar wind. In searching through the works of the very few authors who have visited the interior of the Argentine States, (all but one or two of whom are Europeans,) I find that one only mentions the existence of the above phenomenon, and he did not probably visit the town where my observations were made, which locality is considered by the natives the northern limit of the zondas.

John Miers, author of an interesting work on the provinces of La Plata and Chili, remained a short time in Mendoza, a town nearly one hundred and fifty miles south of San Juan, and capital of the province of Mendoza. He states that this southern locality is annoyed by winds that blow during the summer months from the valley of Zonda, and notes the fact that two dark clouds came from the northwest and hovered over the town during the greater part of the night, and in the morning every thing exposed to the air was covered with fine sand, which was of a light-gray color, and slightly magnetic. It was Miers's opinion that "a *souffriere,* or active volcano," existed to the northward of San Juan, from which the hurricanes and showers of sand originated. Had Mr. Miers visited San Juan, his view of the position of the souffriere, or volcano, would undoubtedly have been changed; for though the zondas sometimes reach Mendoza to the south, the direction of the wind when it strikes that place, differs from the line it follows when it rushes with violence upon the northern town. At San Juan, it comes due west from the Andes; hence the starting-point of the zonda cannot be to the north of the town, as Miers conjectured. According to the account of the natives, the zonda of San Juan does not cover a broader space than ten or fifteen miles after it leaves the Sierra of Zonda. Taking this into consideration, in connection with Miers's statement that the Mendoza zonda comes from the northwest, differing as it will be seen four points from the northern town, we may infer that the Mendoza and San Juan zondas do not blow at the same time. If this be true, it is an interesting fact, showing that this peculiar wind does not always follow the same track.

I remained but a short time in Mendoza, and not being conversant with the language of the inhabitants at that time, could not have collected information relative to the zonda, as it affects that locality, even had I then been aware of its existence.

Miers states that these are summer winds in Mendoza. From personal observation and reliable accounts of educated San Juaninos, I found that they are more particularly the winter winds —at least they are more frequent during that season. Invalids suffering from pulmonary diseases, and complaints affecting the heart and liver, anticipate the month of August (midwinter) with consternation; and their anxiety is not quieted until they have passed through the dreaded ordeal.

While passing the winter in San Juan, I noted the courses of upwards of twenty zondas. Some were of short duration; others lasted eighteen or twenty hours.

During the latter part of August, 1855, while standing upon the saline desert, a few miles east of San Juan, my attention was attracted to a cloud of dust that appeared to roll through the air as it approached me. I started for a shelter, and had hardly reached it, when the zonda swept past, filling the air with fine yellow sand. The temperature of the previously sultry atmosphere suddenly rose many degrees, and the occupants of the neighboring huts were affected with severe headaches. I noted with a compass the course of the wind, and found it to be west. All night, and through the following day and night, it continued blowing with undiminished force. Each hour the vane beside the hut was consulted, and the same course as at first was always observed. A few hours before the wind ceased the sand showers were exhausted. The greatest heat was during the first few hours: and this is always the case, whether the zonda commences during the daytime or night. After continuing for thirty-six hours, the change came. It was instantaneous. The hot wind seemed cut off at right angles by a cold wind from the south. The change could not have occupied more than forty seconds. The south wind lasted twenty hours, and was as violent as the hot zonda. In speaking of the Mendoza zondas, Miers does not mention the succession of the south wind. It is easy to comprehend that after so large a space has become filled with heated air, the effect will be felt in the cooler regions of the south, and a strong current from that direction will rush in to restore the atmospheric equilibrium. Hence the cause of the south wind succeeding the zonda.

Miers believed that the origin of the zondas was volcanic, and for a precedent, I will state, upon the authority of Sir Woodbine Parish, that the volcano Penquenes, which is situated about one hundred miles southwest from Mendoza, and reaches an altitude of nearly fifteen thousand feet above the level of the sea, emits clouds of ashes and pumice-dust. This dust is carried by the winds as far as Mendoza, but these clouds do not strike the town with the force of a San Juan zonda. The pumice-dust is borne along by variable winds. From this fact we may infer that the fine sand of the zondas comes from a similar source. The most important question is, "Where originates the hot and parching wind that always accompanies, and is peculiar to the zondas?" The old guides, who are familiar with the valleys of the Andes, inform me that these winds blow from off the main snow-clad ridge of that great chain of mountains, and express their surprise at the fact, "that from a cold region comes a burning wind."

Strong and steady winds generally follow a direct line. This fact is peculiar to the zondas. If Miers's conjecture be true regarding the origin of these winds, the position of the volcano or souffriere might be found by observing the following suggestion, bearing in mind that the Mendoza wind comes from the northwest, and the San Juan zonda from the west. That point where two lines—one running west from the northern town, the other northwest from the southern town—will intersect, is the starting-point of the sand clouds, if not of the accompanying hot wind.

Looking upon the map of South America, we find in the Cordillera of the Andes, between the latitudes of San Juan and Mendoza, four peaks marked as doubtful volcanoes,—Limari, directly west of San Juan; Chuapu, thirty miles further south; and near the half-way point of the two towns, Ligua. To the north of west of Mendoza, stands prominent the lofty Aconcagua, that has been estimated by two English captains to have an elevation of 23,900 feet. The point of intersection of the west and northwest zonda lines is in the vicinity of Limari and Chuapu, and if not either of these, the zonda volcano is a near neighbor to them.

Mr. Sprague exhibited specimens of a fungus which he had found upon young pear-trees, (*Capnodium elongatum*,) and which had been recently found in great quantities on the stems and leaves of young white pines growing in Hingham, by Mr. T. T. Bouvé. He also exhibited a drawing of the plant, showing the different forms of the peridia, some being merely rounded half-spheres, while others had extended themselves into elongated and forked points. This fungus does not form in the tissues of the plants upon which it is parasitic, but is merely an incrusting growth, spreading over and entirely covering the surface of the stem and leaf. This compact envelope is highly injurious to the infested plant, as it prevents the access of air and light to its tissues. On removing a portion from the pine leaves, the normal green was found to have changed to a dull yellow, similar to that of the decaying leaves.

Dr. A. A. Hayes exhibited some specimens, resembling Trachyte rock so closely, that most observers would have mistaken them for Trachyte.

The specimens consisted of hand specimens, having the uneven fracture of trachyte, full of capillary passages, with some cavities; there were fractured planes of brown and flesh-colored minerals, resembling feldspar, and some small red, brown-colored and black granules; but the most characteristic mark was the occurrence of angular fragments and grains of yellowish green color, hardly distinguishable from *epidote* by the eye. The external surface was brown and uneven, like that of a weathered basalt, or trap. The island from which these specimens came has been examined by a geologist, and from the prevalence of this rock, it is said that he pronounced the island to be of volcanic origin. A mass was sent to Dr. Hayes, and he found it had structural planes, the divisions producing trapezoidal masses, their surfaces and the lines marked by darker colors, and, so far as could be determined, there was evidence of the mass being part of a rock formation of some extent.

The chemical composition discloses the remarkable fact that this rock is composed essentially of fish bones and altered shells, which have passed through the alimentary canals of sea fowls. Referring to communications before made, Dr. Hayes stated that the organic matter of fish bones in the droppings of fowl, reacts on the bone phosphate of lime, to eliminate acid salts of phosphoric acid, and these cement other portions, or decompose shells, which are composed of carbonate of lime and animal tissues.

The feldspar-like granules are generally compact, colored portions of converted shells, having a crystalline form, and there are aggregates of ferruginous and aluminous phosphates, arising from the same kind of action on ferruginous matter, which, in the form of a fine clay, or volcanic ash, has been brought within the sphere of the action of the acid phosphates. The cavities sometimes present minute crystalline facets of phosphate of lime crystals, while the capillary channels and pores, which give the trachyte-like character, are really the passages through which the carbonic acid and other gases escaped, during the transformation of the organic matter, precisely as they occur in basalt and trap, where igneous action has been supposed to have been influential.

This rock is covered more or less by Atlantic guano rock, presenting the variety which consists of compact, light-colored phosphate of lime, containing about twenty parts in one hundred of carbonate of lime, and in some parts is a consolidated shell-bank; the recent shells and coral fragments being visible. Where, through time and favorable exposure, the bone remains have thoroughly decomposed the shells, hand specimens would be mistaken for the flesh-colored, massive phosphate of lime of New Jersey. These more or less well-cemented and altered rocks are also connected with still more recent deposits, retaining even the odorous animal remains of oily acids; and the whole formation, above that of the trachytic form of rock, contains the remains of infusoria.

Thus a small island of the Atlantic, lying about eighteen degrees north of the equator, presents us with an epitomized succession of rock strata, formed from materials which, once endowed with life, have served to nourish other living systems, and then given rise to chemical changes, resulting in the production of various mineral solids which remain.

The trachyte-like rock forming the basis rock of this island, theoretically, may have received its geological and chemical characters in ocean water. A subsidence of the land, after its surface had been deeply covered with organic remains, would allow of that aqueous action of decomposition and cementation which we notice, and the subsequent desiccation would explain the natural divisions by rents. The formation of silicates of iron, manganese, and alumina from phosphates of lime, is a mineralizing process which can take place in ocean water by infiltration, volcanic ashes, or divided materials of plastic rocks being present, as analysis shows them to be. The rock is hydrous, losing nearly ten per cent. of its weight by ignition, or

Water with a little organic matter - - - -	10.00
Bone Phosphate of Lime, - - - - - - - -	85.20
Carbonate of Lime, - - - - - - - - - -	3.00
Oxides Iron, Manganese and Alumina, - - -	5.22
Silicic Acid and Sand, - - - - - - - -	1.78
	105.20

The excess of weight being due to the estimation of the phosphoric acid united to lime as bone phosphate of lime, while truly part of it, with a portion of silica, is united to the oxides present.

Dr. John Bacon exhibited some Calculi, six or seven hundred in number, taken from the bladder of an ox. They were amorphous, presenting no crystalline formation, and containing only a small quantity of organic matter. This is one of the rarest forms of urinary stones.

On motion of Mr. Charles Stodder, it was voted to appoint a Committee to take into consideration and report upon the subject of establishing a Microscopic Department of the Society.

Messrs. Durkee, Jackson, Bacon, Shaw, Sprague, Andrews, and Barnard, were appointed this Committee.

George Duncan Gibb, M. D., of London, was elected a Corresponding Member.

June 3, 1857.

Prof. Wm. B. Rogers, in the Chair.

DEPARTMENT OF MICROSCOPY.

The following report was read and adopted:—

The Committee to whom was referred the subject of establishing a new department for the investigation of microscopic nature, beg leave to offer as a report the following Preamble and Resolutions.

Whereas, The recent acquisition of the invaluable cabinet and library of the late Professor Bailey has awakened the Society to the necessity of giving a new impetus to the progress of microscopic science; to the great usefulness which a special department for the development, record, and publication of observations on the minute structure of organic and inorganic bodies, would possess:

Resolved, That this Society do hereby establish a department for microscopic investigation to be known as the

DEPARTMENT OF MICROSCOPY;

to consist of members of the Society, specially interested in microscopic studies, who may desire to join it. No individuals, who are not members of this Society, shall be members of this department.

Resolved, That a Curator of this department shall be chosen yearly at the Annual Meeting, whose duty shall be to take charge of all specimens and preparations belonging to the department, and to preside at its meetings. The department may appoint sub-committees upon the different branches of the science, to whom shall be referred specimens for examination and report. The Recording Secretary of the Society shall be, *ex officio*, Secretary of this department.

Resolved, That at the first regular meeting of the Society in each month, at the hour of nine o'clock, the presiding officer shall call for microscopic reports, papers, remarks, or exhibitions, in the order here named; and such reports, papers, remarks, or exhibitions shall be in order during the continuance of the meeting, provided that no business matter properly belonging to the Annual Meeting of the Society shall be thus superseded at the regular or adjourned Annual Meetings.

Resolved, That this department shall have the use of the Library Room of the Society for its meetings when desired.

Resolved, That the proceedings of this department shall be published in the Journal and Proceedings of this Society, subject to the decision of the Publishing Committee of the Society.

A Committee, appointed to nominate a candidate for the office of Curator of the Department of Microscopy, reported the name of Dr. Silas Durkee, and he was accordingly chosen Curator of the Department.

Prof. John Bacon exhibited a package of BAILEY'S UNIVERSAL INDICATORS, received from Mr. Gavitt, of Albany, and intended for the use of the Society. Observers, making use of Prof. Bailey's mounted specimens, and being in possession of one of these indicators, may easily find any special object upon the slide which had been referred to or described by Prof. B.

Mr. C. J. Sprague announced the Donation by BENJAMIN D. GREENE, ESQ., the first President of the Society, of his very extensive and valuable HERBARIUM. A Committee, consisting of Messrs. Sprague and Durkee, was appointed to draw up a series of resolutions, expressive of the gratitude of the Society for the donation, and of its proper estimation of its value.

The Curator of Crustacea and Radiata, Mr. Theodore Lyman, was empowered to loan Mr. Bowerbank of London, certain specimens of sponges, to aid him in the publication of a work upon this subject.

The Corresponding Secretary read the following list of letters recently received:—

Elliott Society of Natural History, Charleston, S. C.; Ethnological Society, London, January 31, 1857; K. Bayerische Akademie der Wissenschaften, February 4, 1857; Imperial Mineralogical Society of St. Petersburg, November 30, 1856; Verein für Vaterländische Naturkunde in Wurtemberg, January 20, 1857; Accademia, &c., di Bologna, May 29, 1856; Royal Geographical Society, London, November 29, 1856, acknowledging the receipt of the Society's publications; also from the last five above-named institutions, presenting various publications, as well as from the Naturforschende Gesellschaft zu Emden, October 2, 1856.

Messrs. Archelaus Wilson of Boston, and R. H. Barnwell of the Scientific School, were elected Resident Members.

June 17, 1857.

Dr. D. H. Storer, Vice-President, in the Chair.

The Committee appointed to prepare Resolutions, expressive of the sentiments of the Society in recognition of the donation by Benjamin D. Greene, Esq., of his Botanical Collection, submitted the following, which were unanimously adopted: —

Resolved, That this Society is deeply sensible of the active sympathy which has ever been exhibited in its welfare by its first President, Benjamin D. Greene, Esq.,—a sympathy which has led him to bestow upon the Society his extensive and valuable Herbarium, the fruit of a long lifetime devoted to the cultivation of botanical science, to a diligent accumulation of the world's vegetable productions, and a critical study of our native flora, which his own frequent discoveries have enriched.

Resolved, That the proffer of this rare collection of plants is gratefully and cordially accepted; and the Corresponding Secretary is instructed to inform Mr. Greene of this acceptance, transmitting a copy of these resolutions.

Mr. Sprague stated that the Herbarium is particularly rich in specimens collected by various Exploring Expeditions, both of this country and of Europe; reports of some of which have not as yet been published. Very many of the plants are new to the Society's cabinet, and the collection altogether is very extensive and exceedingly valuable.

Prof. Wm. B. Rogers made some remarks upon a peculiar geological condition which he had noticed in the Slate Rocks of Governor's Island, in Boston Harbor, and of which he had never seen any notice.

At the landing near the fort, where the slate is exposed, he had observed a series of ledges of dark grayish-blue slate, in which is exposed a species of *fault* known as *horizontal heave*. There are two lines of direction in the beds, and these are at right angles with each other. This phenomenon of horizontal heave, combined with the system of cross cleavage which is at right angles with the planes of bedding, creates some obscurity in some spots as to which are the original planes of bedding. In other localities, and especially in the Quincy and Braintree siliceous slate in which trilobites have been recently found, the same difficulty exists; rendering it impracticable to obtain perfect specimens of that fossil in any amount, since the rock splits off in an opposite direction to that in which the animal was deposited.

This system of horizontal heave has been extensively studied in Europe, and has elicited much discussion from geologists and physicists upon the theory of the phenomena engaged in its production. It is supposed that a great pressure has been applied to the rocky mass, either before or after it had reached a complete state of solidity, and that this pressure has produced such a structural arrangement as to develop particular planes of cleavage where the adhesion was the slightest. This supposition has been sustained by experiment, recently instituted in England, in which it has been demonstrated that scales of mica and other material of flattened form, intermingled with plastic clay and submitted to continuous and energetic pressure, assume approximate parallelism, and impart to the mass a laminar structure. Where cleavage shows itself in limestone containing mica scales and flattened particles of silica, the microscope has detected an approximate degree of parallelism between these substances and the cleavage planes.

Dr. S. Kneeland, Jr., exhibited two specimens of Siredon, taken in Portage Lake, Michigan, which were described by him in the Proceedings of February, 1857, and which he had succeeded in keeping alive. These animals are very hardy, the water in which they were contained having been frozen and thawed many times in succession during the last winter, when their only food was such minute matter as they might have found in the lake water. They have maxillary and palatal teeth, and though they are very much feared by the Indians, on account of the supposed poisonous nature of their bite, yet Dr. Kneeland has not known them to attack each other; and he himself handles them very freely, without any attempt of the animal to bite. The heads of the two specimens are of different shape, and possibly they are of different sexes. Since they have been in Boston, they have been fed upon live worms by Dr. Durkee, of which they will consume several every day. Near the gills upon the surface of the body are a number of parasitic worms, rough drawings of which were exhibited by Dr. Durkee.

Dr. H. R. Storer said he had been informed that an Albino of the Common Striped Squirrel of Massachusetts (*Sciurus striatus*) had been taken at South Framingham. It was perfectly white, with pink eyes, and a note like that of the common striped squirrel.

The Secretary, at the request of Dr. T. M. Brewer, exhibited specimens of a Gum from California, which was said to resemble in its properties Gum Arabic, and of a bark which was stated to have the mucilaginous character of Slippery Elm Bark. The specimens were samples of some presented to the California Society of Natural History by Dr. Thomas Payne, of Mariposa, Cal., and forwarded to Dr. Brewer by Dr. Holden; they were referred to Dr. Hayes for analysis.

Mr. Thomas Hollis (after a moment's examination of it) stated that the bark bore considerable resemblance to the Wild Cherry Bark. It had a similar odor, but it was not so astringent. The mucilage from this is not immediately extracted in the mouth, but, as is the case with the Wild Cherry Bark, it may be developed after some hours maceration in cold water. The wild cherry likewise exudes a gum similar to this.

Dr. A. A. Gould presented, in the name of William M. Bailey, Esq., of Providence, a Photograph of his brother, the late Prof. Bailey of West Point. The thanks of the Society were voted for the gift.

Messrs. Theodore Metcalf, George N. Davis, and Thomas D. Morris were elected Resident Members.

ADDITIONS TO THE MUSEUM.

April 15, 1857. Bequest of the late Prof. Jacob W. Bailey, consisting of his complete Microscopical Collection, Algæ, &c., an inventory of which will be found in the Report of the Committee on page 194. A collection of Shells, Crustacea, and Corals; presented by N. E. Atwood. A Trumpet Fish (*Centriscus scolopax*); by Dr. D. H. Storer, the first known to have been taken on this coast. A collection of Algæ; by J. C. Parkinson. A Double-collared Arracari (*Pteroglossus bitorquatus*); a Field Fare (*Turdus pilaris*); a Woodlark (*Anthus arboreus*); by Dr. F. J. Bumstead. A Robin (*Turdus migratorius*); by E. Samuels. A specimen of *Dipsas plicata*, from the East Indies, with images encrusted by the nacre upon its internal surface; by Lieut. G. H. Preble, U. S. Navy; a Female Snow-Goose and a Shoveller Duck from Virginia; by Wm. Sohier. A Song Sparrow and a Robin; by E. Samuels.

May 20. Burrowing Owls (*Athene cunicularia*) male and female, from South America; by N. H. Bishop. Native Borate of Lime from South America; by R. H. Eddy. Fossils and Acorns; by Theodore Parker. Vitreous Copper Ore from South Carolina; by Dr. C. T. Jackson. Saw of a Saw Fish; by Geo. S. Wheelwright.

June 3. The extensive and valuable Herbarium of Benjamin D. Greene, Esq., the first President of the Society. Shells and Crustacea from Hiltonhead, S. C.; by J. S. Fay, Esq. Sponges from Singapore, and Corals; by S. Durkee. Cast of the Brain of Spurzheim; by Theodore Parker.

June 17. A Photograph of the late Prof. J. W. Bailey, presented by his brother W. M. Bailey, Esq., of Providence; *Arvicola austerus*, two specimens, *A. riparius*, *Hesperomys Bairdii*, *Vireo solitarius*, *Trichas Philadelphica*, *Vermivora chrysoptera*, *V. peregrina*, *Rallus elegans*, and a collection of Shells, all from Illinois; by Thomas Kennicott.

BOOKS RECEIVED DURING THE QUARTER ENDING JUNE 30, 1857.

Description of New Fossil Crinoidea from the Palæozoic Rocks of Western and Southern Portions of the United States. By B. F. Shumard, M. D. 8vo. Pamph. Philadelphia, 1857. *From the Author.*

Synopsis Avium Tanagrinarum. By P. L. Sclater. 8vo. Pamph. London. *From the Author.*

Archiv für Naturgeschichte, gegründet von A. F. A. Wiegmann. Fortgesetzt von W. F. Erichson. Sechstes Heft pp. 1–486. 8vo. 3 nos. Berlin, 1855. *From Dr. F. H. Froschel.*

Annual Report of the Trustees of the New York State Library. 8vo. Pamph. Albany, 1457. *From the Trustees.*

Seventeenth Annual Report of the Regents of the University of New York. 8vo. Pamph. Albany, 1857. *From the Regents.*

Fourth Annual Report of the Secretary of the Massachusetts Board of Agriculture. 8vo. Boston, 1857. *From J. L. Flint, Esq., Secretary.*

Report of the Commissioners on the Artificial Propagation of Fish. Massachusetts Legislative Document. 8vo. Pamph. Boston, 1857. *From N. E. Atwood, Esq.*

Proceedings of the American Association for the Advancement of Science. Tenth Meeting, Albany, N. Y., 1856. 8vo. Pamph. Cambridge. *From the Association.*

Laws of Structure of the more disturbed Zones of the Earth's Crust. By Prof. H. D. Rogers. 4to. Pamph. Edinburgh, 1856.

Geology and Physical Geography of North America. By the same. 8vo. Pamph. London, 1856.

Edinburgh New Philosophical Journal. New Series. Nos. 6, 8, 9. 8vo. 1856–7. *From Prof. H. D. Rogers.*

Rapport spécial sur les mesures qui ont été adopté pour l'Etablissement d' une École Normale. 12mo. Pamph. Montreal, 1847.

Regles et Reglements de l'Assemblée Legislative. 18mo. Pamph. Toronto, 1856.

Listes des Rapports ou Etats de la Legislature du Canada. Long 4to. Pamph. Toronto, 1856.

Assemblée Legislative, 1856, Liste des Lois Expirantes. 4to. Pamph. Toronto.

Sommaires des Deliberations de l'Assemblée Legislative du Canada. Long 4to. Pamph. Toronto, 1856.

Journal du Cultivateur et Procédés du Bureau d'Agriculture du Bas-Canada. Vol. III. Nos. 1–12, and Vol. IV. Nos. 1–8. 4to. Pamph. Montreal, 1856.

Journal de l'Instruction Publique. Vol. I. No. 3. 4to. Pamph. Montreal, 1857.

Farmers Journal. 4to. Pamph. Vol. IV. No. 12. Montreal, 1857.

Second Rapport sur l'Exploration des Lacs Supérieur et Huron. Par le Compte de Rottermund. 8vo. Pamph. Toronto, 1857.

Tables of Trade and Navigation of Canada for 1856. 8vo. Pamph. Toronto, 1857.

Reports of Commissioners of Crown Lands of Canada for 1856. 8vo. Pamph. Toronto, 1857. *From L. A. Huguet Latour.*

Transactions of the Academy of Science at St. Louis. No. 1. Vol. I. 8vo. Pamph. St. Louis, 1857.

Silliman's American Journal of Science and Arts. No. 69, for May, 1857. 8vo. New Haven.

Verhandlungen des Naturhistorischen Vereines der Preussischen Rheinlande und Westphalens. Dreizehnter Jahrgang. Drittes heft. 8vo. 2 nos. Bonn, 1856.

Natural History Review. Nos. 9, 10, 11. 8vo. London, 1856.

Proceedings of the Royal Geographical Society of London. Nos. 6, 7. 8vo. Pamph. 1857.

Transactions of the American Philosophical Society. Vol. XI. Part 1. 4to. Philadelphia, 1857.

Journal of the Royal Geographical Society. Vol. XXVI. 8vo. London, 1856.

Transactions of the Cambridge Philosophical Society. Vol. IX. Part 4. Cambridge, (England,) 1856.

Natural History Review. No. 1. January, 1857. 8vo. London.

Canadian Naturalist. Vol. II. No. 2. May, 1857. 8vo. Pamph. Montreal.

Conchological Miscellany. By S. Hanley. Nos. 2, 3. 4to. Pamph. London.

Proceedings of the Academy of Natural Sciences of Philadelphia. pp. 17–100. 8vo. 1857.

Catalogue of Human Crania in the Collection of the Academy of Natural Sciences at Philadelphia. By J. A. Meigs, M. D. 8vo. Pamph. 1857.

Beitrage zur Kenntniss der Landplanarien nach Mittheilungen des Dr. Fritz Müller in Brasilien und nach eigenen Untersuchungen von Dr. Max Schultze. 4to. Pamph. Halle, 1857.

Jahrbucher des Vereins für Naturkunde im Herzogthum Nassau. Heft XI 8vo. Pamph. Wiesbaden, 1856.

Wurttembergische Naturwissenschaftliche Jahreshefte. Zehnter Jahrgang Drittes Heft. Zwölfter Jahrgang; Drittes Heft. Dreizehnter Jahrgang; Erstes Heft. Stuttgart. 8vo. 1856–7.

Die Gewitten des Jahres 1855. Ein Beitrag zur Physiologie der Atmosphäre von Dr. M. A. F. Prestel. 8vo. Pamph. Emden.

Verhandlungen der Russisch-Kaiserlichen Mineralogischen Gesellschaft zu St. Petersburg. Jahrgang, 1855–6. 8vo. Pamph. 1856.

Gelehrte Anzeigen der K. Bayer. Akad. der Wissenschaften. Band 42, 43. 4to. München, 1856.

Theorie und Anwendung des Seitendruck-spirometers, von Dr. E. Harless. 4to. Pamph. München, 1856.

Bemerkungen über den Zusammenhang zwischen dem Bildungs gesetze eines Kettenbruches. Von L. Seidel. 4to. Pamph. München, 1855.

Beitrage zu Einens Wissenschaftlichen Begründung der Lehre von Mienenspiel. Von Prof. Dr. E. Harless. 4to. Pamph. München, 1855.

Preussischen Staaten. Neuve Reihe. Dritte Jahrgang. 2 nos. Juli, 1855, Juni, 1856. 8vo. Berlin.

Memorie della Accademia delle Scienze dell' Istituto di Bologna. Tome VI. 4to. 1855.

Rendiconto delle Sessioni dell' Accademia delle Scienze dell' Istituto di Bologna. 8vo. Pamph. 1850–55.

New York Journal of Medicine. Vol. II. No. 3. 8vo. New York, 1857. *Received in Exchange.*

Annals and Magazine of Natural History. Vol. XIX. Nos. 111–114. London, 1857. *From the Courtis Fund.*

History of Massachusetts. The Commonwealth Period. By J. S. Barry. 8vo. Boston, 1857.

Burke's Works. Vols. IV. V. VI. Also, his Speeches. Vols. I. II. 12mo. London, 1855–7.

Arctic Adventures by Land and Sea. Edited by Epes Sargent. 12mo. Boston, 1857.

Biographical and Historical Sketches. By T. B. Macaulay. 8vo. New York 1857.

Testimony of the Rocks. By Hugh Miller. 8vo. Boston, 1857.

My Last Cruise. By A. W. Habersham. 8vo. Philadelphia, 1857.

Essays Biographical and Critical. By H. T. Tuckerman. 8vo. Boston, 1857.

New Biographies of Illustrious Men. By T. B. Macaulay and others. 8vo. Boston, 1857.

Life of George Washington. By Washington Irving. Vol. IV. 8vo. New York, 1857. *Deposited by the Republican Association.*

BEQUEST OF PROF. J. W. BAILEY.

Agardh, C. A. Systema Algarum. 16mo. Lund. 1824.

Agardh, Jacobus G. Algæ Maris Mediterranei et Adriatici. Observationes in diagnosin Specierum et dispositionem Generum. 8vo. Paris, 1842.

Agardh, Jacobus G. Species, Genera, et Ordines Algarum. 8vo. 2. Lund. 1848–51.

Areschoug, J. E. Phyceæ Scandinaviæ Marinæ. 4to. Upsal, 1850.

Braun, Alexander. Algarum Unicellularium Genera nova et minus cognita, præmissis Observationibus de Algis Unicellularibus in Genere. 4to. Lipsiæ, 1855.

Postel, Alexander et Ruprecht, Franciscus. Illustrationes Algarum in Itinere circa Orbem. Atlantic fol. Petropoli, 1840.

De Buch, Leopold. Petrifactions receuillies en Amerique par A. de Humboldt, et par M. C. Degenhart. Imp. fol. Berlin, 1839. (*Presentation Copy.*)

Busch, Wilhelm. Beobachtungen ueber Anatomie und Entwickelung einiger Wirbellosen Seethiere. 4to. Berlin, 1851.

Dana, J. D. Structure and Classification of Zoöphytes. 4to. Philadelphia, 1846.

Dujardin. Nouveau Manuel complet de l' Observateur au Microscope. 18mo. Paris. Accompagné d' un Atlas renfermant trente planches graveés sur acier. Royal 8vo. Paris, 1842.

Ehrenberg, C. G. Verbreitung und Einfluss des Mikroscopischen Lebens in Sud und Nord Amerika. Fol. Berlin, 1843.

——————— Passat-Staub und Blut-Regen, ein grosses organischer unsichtbares Wirken und Leben in der Atmosphäre. Fol. Berlin, 1849.

——————— Microgeologie. Das Erden und Felsen schaffende wirken des unsichtbar kleinen selbständigen Lebens auf der Erde. Imp. fol. Leipzig, 1854–6.

Elliott, Stephen. Sketch of the Botany of South Carolina and Georgia. 8vo. 2 vols. Charleston, 1821–24.

Endlicher, S. L. Mantissa Botanica altera. Sistens Generum Plantarum tertium. Roy. 8vo. Vindob. 1843.

Harvey, W. H. Manual of the British Algæ. With plates. 8vo. London, 1849. (*Presentation Copy.*)

——————— Nereis Australis; or Algæ of the Southern Ocean. 4to. London, 1847. (*Presentation Copy.*)

——————— Phycologia Britannica, or History of British Seaweeds. Colored Figures. 8vo. 4 London. 1846–51.

——————— Nereis Boreali-Americana, or Contributions towards a History of the Atlantic and Pacific Coasts of North America. Part I. Melanospermeæ. Part II. Rhodospermeæ. 4to. Washington, 1851.

Hassall, A. H. History of the British Fresh Water Algæ. 8vo. London, 1845.

——————— Microscopic Anatomy of the Human Body in Health and Disease. 8vo. 2. New York, 1851. (*Presentation Copy.*)

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July 1, 1857.

Dr. Chas. T. Jackson, Vice-President, in the Chair.

The Report of the Committee appointed to audit the Treasurer's Annual Account was read and accepted.

Dr. A. A. Hayes reported that a specimen of Gum from California, referred to him at the last meeting, had been examined chemically. It proved to be pure Arabine, or the colorless constituent of gums, which is soluble in cold water and forms a clear gum solution, without the character of emulsion. This gum is commercially valuable, the quality being fully equal to any imported.

A specimen of Bark from California, also referred to him, was found to contain mucilage, analogous to that of the bark of the *Ulmus fulva,* (Slippery Elm.) It was not, however, so abundant, and it was less soluble in water. Besides mucilage, a small portion of one of the varieties of tannin gives astringency when the bark is chewed. These are not substances of value, and there is no reason for supposing that this bark will prove specially important.

Dr. A. A. Hayes exhibited a specimen of Octohedral Tin Ore rom the gold washings of Owen's River, on the way from Melbourne to Sydney, Australia. The ore is accompanied by titaniferous and chromiferous iron ores, garnets, and yellow quartz. In this connection, he stated that he had examined the black sands of many of the gold washings of California, in which, besides garnets and topazes, cinnabar is generally found, without detecting tin ore. Some of the titaniferous iron crystals yield the slight traces of oxide of tin, often found in the ore, but no crystals of pure oxide of tin have been found. Although, in general, a resemblance exists between the sands of Australia and those of California, the heavy ores found are not the same in both.

Mr. F. H. Storer exhibited specimens of Lithium, Strontium, and Calcium, and described the process of their preparation.

Dr. Jackson presented a specimen of Sugar obtained by Mr. Wray from the *Sorghum saccharatum*, or Chinese Sugar Cane, which was raised in Algeria. He likewise presented some of the dried juice of the Sorghum, which he had prepared from samples of the plant raised in Massachusetts.

Dr. Hayes stated that the plant, when raised in Algeria, contained Cane Sugar, but that, when raised in this climate, it had been satisfactorily determined, by both microscopical and chemical examinations of the juice in the cells, that only Grape Sugar is produced. The specimens were referred to the Microscopical Department.

MICROSCOPICAL DEPARTMENT.

The Curator of the department announced the donation, by Dr. John Bacon, of a handsome portable double Argand Gas Burner, together with the accompanying apparatus for connection with the gas pipes of the building. These burners were used for the microscopical demonstrations of the evening, and found very convenient and effective.

Dr. Durkee exhibited some living specimens of *Vorticella crateriformis*, Ehrenberg. He stated that this infusorial animalcule first made its appearance upon a *Gordius aquaticus*, one of the so-called horse-hair worms, so commonly found in pools of water, which he had alive at his office, and that the Vorticella afterwards was propagated upon the skin of a Salamander, and upon a piece of cork, kept in the same glass vessel with the worm. The animalcule surmounts a flexible stem or pedicle, it is transparent, and its mouth is surrounded by numerous cilia, which are constantly in motion, and serve to keep the water in circulation and to bring food near it. The Vorticellæ, assuming a great variety of elegant forms, with their pedicles at times partially coiled in a spiral form, and at other times elongated, and with the cilia in motion, producing a current carrying with it small particles of water into the alimentary sack, were beautifully seen upon the stand of the microscope.

Dr. Bacon exhibited some very large and fine specimens of Cystine, from the spontaneous deposit of the urinary excretion of a person who has passed several Cystine Calculi within a few months. This substance is of extremely rare occurrence here.

Dr. Bacon also exhibited some Crystals of the Sulphate of Iodo-Quinine, a substance remarkable for its polarizing action, and some Zeolitic Crystals of Carbonate of Lime, from the urine of the horse.

Dr. Durkee exhibited specimens of *Vallisneria spiralis*, an aquatic plant, growing in great abundance in Fresh Pond and other waters. The circulatory fluid of the plant, running in channels around the cells of which it is composed, was plainly demonstrated by the microscope.

Mr. Sprague exhibited specimens of an Alga which he found in a sulphur spring near Portland, Me. It grew in abundance, investing the neighboring grass, sticks, leaves, &c., with a soft flaccid, snow-white fringe. It was found to consist, under the microscope, of excessively slender, pellucid filaments, about a line or more long, filled with minute granules, arranged in no particular order. The filaments were simple, and attached firmly to the object on which they grew. Mr. Sprague supposed that it might be the *Calothrix nivea*, Ag.

He also exhibited some of the minute fungi of the order *Coniomycetes—Sporidesmium concinnum* and *Sporidesmium epiphyllum.*

Messrs. John S. Martin and Edwin Manley were elected Resident Members.

July 8, 1857.

MICROSCOPICAL DEPARTMENT.

Dr. Silas Durkee, Curator, in the Chair.

It was voted to appoint sub-committees, to whom should be referred specimens for microscopic examination; and the following were appointed, viz: —

Anatomy.—Jeffries Wyman, Silas Durkee, A. A. Gould, O. W. Holmes, H. I. Bowditch, J. N. Borland, D. F. Weinland.

Geology and Mineralogy.—A. A. Hayes, C. T. Jackson, W. B. Rogers, H. D. Rogers, Louis Agassiz, T. T. Bouvé.

Botany.—C. J. Sprague, S. Durkee, C. L. Andrews.

Pathology.—D. S. Shaw, Calvin Ellis, H. J. Bigelow, C. D. Homans.

Chemistry.—John Bacon, C. T. Jackson, A. A. Hayes, J. P. Cooke, F. H. Storer.

Messrs. Bacon, Cooke, and Shaw were appointed a committee to examine the specimens of *Sorghum saccharatum* referred to the department at the previous meeting of the Society.

July 15, 1857.

Dr. C. T. Jackson, Vice-President, in the Chair.

The Committee of the Council to whom was referred the consideration of the expediency of raising the Annual

Assessment from three to five dollars, presented a report, which was read and accepted. The Committee concluded their report with the recommendation that the Annual Assessment be five instead of three dollars. The consideration of this recommendation was postponed to the next meeting.

The Chairman read a letter from Townend Glover, of Washington, returning thanks to the Society for his election as Corresponding Member, and accepting the same. Mr. Glover likewise wrote that he intended soon to send to the Society a number of plates of Insects Injurious to Vegetation, which he was preparing for publication.

Mr. T. J. Whittemore read a letter from a gentleman in Germany, proposing to exchange a collection of Fossil Shells of Austria for those of North America, or a rare and costly work on fossils for the same. The letter was referred to the Curator of Geology.

Dr. S. Kneeland, Jr., read the following paper: —

ON THE BIRDS OF KEWEENAW POINT, LAKE SUPERIOR.

BY S. KNEELAND, JR., M. D., BOSTON.

Most of the birds mentioned in the following list were seen by me during a residence of nearly a year at Portage Lake, from August, 1856, to June, 1857. A few have been introduced on the authority of competent eye-witnesses. When there is any doubt concerning the occurrence of a bird, it is so indicated. In Keweenaw Point, I include that portion of the Upper Peninsula of Michigan which extends up into Lake Superior, embracing not only the Point proper, but the western portion as far as Ontonagon, the region of Portage Lake and Entry, and the Anse of Keweenaw Bay—all of which localities I have visited.

This region lies between 47° and 48° north latitude, and between 88° and 90° longitude west from Greenwich, being the so-called "Copper Region" of Lake Superior.

It is probable that many birds, especially among the warblers and migratory species, will be added to this list hereafter; and it is almost certain that many others inhabit the adjacent country, which has been very little explored. This, therefore, is only an approximation to a complete list of the birds of Upper Michigan.

This district is, for the most part, heavily wooded with pines, spruces, firs, balsams, cedars, maples, and birches, and would be naturally supposed to be the favorite retreats of many more birds than are found in it. The stillness of the dark and virgin forests is most remarkable; and it is only during the few warmer months that the woods lose this dismal character. Snow begins to fall about the middle of November, from which date to the middle of March, scarcely a day passes without a fall of snow some time during the twenty-four hours—hence only the hardier birds remain during the winter. The numerous small lakes and water-courses are the favorite resorts of many water-birds, some of whom breed here.

Of mammals, the small fur-bearing animals alone are common; such as the fox, beaver, otter, fisher, marten, mink, and musk-rat—wolves are quite unknown; deer scarce, and bears few. Porcupines and squirrels are numerous.

FALCONIDÆ.

1. Golden Eagle. *Aquila fulvus*, Linn. This bird I have not seen, neither have I met with any one who has seen it beyond a doubt; though, from the reports of hunters and Indians, I am inclined to think it is found here.

2. Bald Eagle. *Haliætus leucocephalus*. Linn. Breeds on the Point and near Portage Lake.

3. Fish Hawk. *Pandion haliætus*, Linn.

4. Gyr-Falcon. *Falco Islandicus*, Brünn. I have heard of a white falcon, of large size, (measuring about five feet in the spread of his wings,) which was shot on the Point; this, I think, must have been the gyr-falcon.

5. Great-footed Hawk. *Falco peregrinus*, Linn.

6. Pigeon Hawk. *Hypotriorchis columbarius*, Linn.

7. Sparrow Hawk. *Tinnunculus sparverius*, Linn.

8. Common Buzzard. *Buteo vulgaris*, Bechst.

9. Red-shouldered Hawk. *Buteo lineatus*, Gmel.

10. Red-tailed Buzzard. *Buteo borealis*, Gmel.

11. Rough-legged Buzzard. *Archibuteo lagopus*, Brun.
12. Goshawk, (doubtful) *Astur palumbarius*, Linn.
13. Cooper's Hawk, (doubtful.) *Accipiter Cooperi*, Pr. Bonap.
14. Sharp-shinned Hawk. *Accipiter fuscus*, Gmel.
15. Common Harrier. *Circus cyaneus*, Linn.

STRIGIDÆ.

16. Hawk Owl. *Surnia funerea*, Gmel. This owl is common in the neighborhood of Eagle River and Harbor; it is not found at Portage Lake.
17. Snowy Owl. *Nyctea nivea*, Thunb.
18. Acadian Owl. *Athene Acadica*, Temm.
19. Cinereous Owl. *Syrnium cinereum*, Gmel.
20. Barred Owl. *Syrnium nebulosum*, Gmel.
21. Great Horned Owl. *Bubo Virginianus*, Gmel.
22. Mottled Owl. *Ephialtes asio*, Linn.

CAPRIMULGIDÆ.

23. Whip-poor-will. *Caprimulgus vociferus*, Wils.
24. Night-Hawk. *Chordeiles Virginianus*, Briss.

HIRUNDINIDÆ.

25. Barn Swallow. *Hirundo rufa*, Vieill.
26. White-bellied Swallow. *Hirundo bicolor*, Vieill.

ALCEDINIDÆ.

27. Belted Kingfisher. *Ceryle alcyon*, Linn.

CERTHIDÆ.

28. Red-bellied Nuthatch. *Sitta Canadensis*, Lath.
29. Winter Wren. *Troglodytes hyemalis*, Vieill.

LUSCINIDÆ.

30. Blue Bird. *Sialia Wilsoni*, Swains.
31. Arctic Blue Bird. *Sialia arctica*, Swains.
32. Water Thrush. *Enicocichla Noveboracensis*, Gmel.
33. Black-capped Tit. *Parus atricapillus*, Wils.
34. Hudson's Bay Tit. *Parus Hudsonicus*, Mill.

35. Yellow-poll Warbler. *Mniotilta æstiva*, Gmel.

36. Canada Warbler. *Mniotilta Canadensis*, Linn.

37. Yellow-rumped Warbler. *Mniotilta coronata*, Linn.

38. Black-poll Warbler. *Mniotilta striata*, Gmel.

39. Black and Yellow Warbler. *Mniotilta maculosa*, Gmel.

40. Black-throated Green Warbler. *Mniotilta virens*, Gmel. (Doubtful.) It is probable that many other warblers are found here ; and it is said that some are, on more or less good authority ; but where there is so little certainty, I prefer to leave the list of warblers to be filled up hereafter.

41. Wagtail. *Anthus Ludovicianus*, Gmel.

TURDIDÆ.

42. American Robin. *Turdus migratorius*, Linn. This bird appears in the latter part of April, a month before the snow leaves the ground.

43. Wood Thrush. *Turdus mustelinus*, Gmel.

44. Rufous-backed Thrush. *Turdus fuscescens* ? Shaw.

45. Olive-backed Thrush. *Turdus solitarius* ? Wils.

46. Cat-Bird. *Mimus Carolinensis*, Linn. This bird is not found at Portage Lake, though it is said to occur in the more settled parts of the country. As this is one of the species which follow the course of agriculture, it is quite likely that it will soon become a general summer resident.

MUSCICAPIDÆ.

47. King Bird. *Tyrannus intrepidus*, Vieill.

48. Pewit Flycatcher. *Myiobius nunciola*, Wils.

49. Wood Pewee. *Myiobius virens*, Linn.

50. Redstart. *Setophaga ruticilla*, Gmel.

51. Red-eyed Vireo. *Vireo olivaceus*, Linn.

52. White-eyed Vireo. *Vireo Noveboracensis*, Gmel.

AMPELIDÆ.

53. Bohemian Wax-wing. *Ampelis garrulus*, Linn.

54. Cedar Bird. *Ampelis cedrorum*, Vieill.

LANIIDÆ.

55. Great American Shrike. *Lanius septentrionalis*, Gmel.

CORVIDÆ.

56. Canada Jay. *Perisoreus Canadensis*, Linn. This bird is common in the winter, and a great pest to the trappers, from its propensity to steal their poisoned baits. Like the raven, it often falls a victim to its greediness, by devouring meat containing strychnine set for foxes and the fur-bearing animals.

57. Blue Jay. *Cyanocorax cristatus*, Linn. Not common on Portage Lake.

58. American Magpie. *Pica Hudsonica*, Sabine. I have seen a few specimens obtained near Eagle River.

59. American Raven. *Corvus cacalotl*, Wagl. Very common at Portage Lake; in the winter almost, if not entirely, to the exclusion of the crow.

60. American Crow. *Corvus Americanus*, Aud. Rare at Portage Lake, but common on the Point and in the Ontonagon district.

STURNIDÆ.

61. Rusty Grakle. *Scolecophagus ferrugineus*, Wils. Early in the spring these birds arrive in immense flocks, and exceedingly fat; they remain till about the last of September.

62. Cow Blackbird. *Molothrus pecoris*, Gmel.

63. Red-winged Blackbird. *Agelaius phœniceus*, Linn.

64. Bob-o'-link, (doubtful.) *Dolichonyx oryzivorus*, Linn.

FRINGILLIDÆ.

65. Rose-breasted Grosbeak. *Guiraca ludoviciana*, Linn.

66. American Goldfinch. *Fringilla tristis*, Linn.

67. Lesser Red-poll. *Fringilla linaria*, Linn. These birds are seen in flocks of twenty or thirty all through the winter, in the woods near the lake and in the beaten roads, in company frequently with the snow-birds. They show a singular propensity to pick in snow stained by human urine; though the roads be full of the dung of cattle containing oats and pieces of corn, the linnets I have always seen in crowds about the spots in the snow discolored from the above cause; whether this habit was from a desire to obtain fluid at a season when the snow does not melt even at mid-day, or some of the elements of this secretion,

I cannot say. Similar congregations of bees and wasps are often noticed about public urinals in the country.

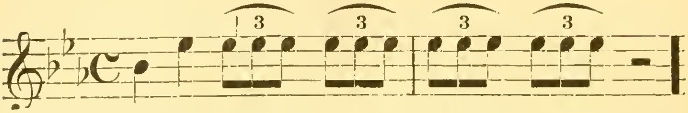
68. Snow Bird. *Fringilla hyemalis*, Linn.

69. Pine Finch. *Fringilla pinus*, Wils.

70. Fox-colored Sparrow. *Zonotrichia iliaca*, Merr.

71. Song Sparrow. *Zonotrichia melodia*, Wils.

72. White-throated Sparrow. *Zonotrichia albicollis*, Gmel. This bird is very abundant. Its beautiful and plaintive notes may be musically represented as follows:—



as to interval and time in a flat key; this should be written two octaves above, and the fourth interval (E flat) should be what is called a "flat fourth;" sometimes the first two notes only are heard, at others, from one to the four triplets in addition; instead of the triplets, an equivalent single note is often given for one or more of them. I have heard its sweet song at all hours of the day and night in the spring and summer.

73. White-crowned Sparrow. *Zonotrichia leucophrys*, Forst.

74. Bay-winged Sparrow. *Zonotrichia graminea*, Gmel.

75. Chipping Sparrow. *Zonotrichia socialis*, Wils.

76. Tree Sparrow. *Zonotrichia monticola*, Gmel.

77. Snow Bunting. *Plectrophanes nivalis*, Linn.

78. Lapland Lark Bunting. *Plectrophanes lapponicus*, Linn.

79. Shore Lark, (doubtful.) *Otocoris alpestris*, Linn.

80. Purple Finch. *Carpodacus purpureus*, Gmel.

81. Pine Grosbeak. *Strobilophaga enucleator*, Linn.

82. Common Crossbill. *Loxia Americana*, Wils.

83. White-winged Crossbill. *Loxia leucoptera*, Gmel. The former of these crossbills occurs in large flocks during most of the winter, hopping about the houses with the familiarity of chipping sparrows. The white-winged species I have not seen; but I am confident it is found here.

PICIDÆ.

84. Arctic Woodpecker. *Picoides arcticus*, Rich. and Sw.

85. Three-toed Woodpecker. *Picoides hirsutus*, Vieill. The first of these species is common during the whole of the severe winters of Lake Superior.

86. Hairy Woodpecker. *Picus villosus*, Linn.

87. Downy Woodpecker. *Picus pubescens*, Linn.

88. Canada Woodpecker. *Picus leucomelas*, Bodd.

89. Pileated Woodpecker. *Dryocopus pileatus*, Linn.

90. Red-headed Woodpecker. *Melanerpes erythrocephalus*, Linn.

91. Golden-winged Woodpecker. *Colaptes auratus*, Linn.

COLUMBIDÆ.

92. Passenger Pigeon. *Ectopistes migratorius*, Linn. I have seen them at Portage Lake as early as May 4.

TETRAONIDÆ.

93. Common Quail. *Ortyx Virginianus*, Linn. This is another of the birds that follow man in his agricultural movements. A few years since quails were unknown in the Upper Peninsula; now they are not uncommon on the Point; as yet they have not been seen on Portage Lake. As more attention is paid to agriculture for the support of the mining population, the quail will doubtless be common in the fields.

94. Canada Grouse. *Tetrao Canadensis*, Linn.

95. Ruffed Grouse. *Bonasa umbellus*, Linn. The first species is comparatively rare; I have never heard of one being seen on Portage Lake. The latter species is very common in the woods at all seasons of the year.

96. White Ptarmigan. *Lagopus mutus?* Leach. There is a white grouse in this region, but whether it is the *L. mutus*, *albus*, or *leucurus*, I cannot positively say.

CHARADRIADÆ.

97. Black-bellied Plover. *Squatarola Helvetica*, Linn.

98. Golden Plover. *Charadrius pluvialis*, Linn.

99. American Ring Plover. *Charadrius semipalmatus*, Kaup.

ARDEIDÆ.

100. Sandhill Crane. *Grus Americana*, Linn.

101. Green Heron. *Ardea virescens*, Linn.

102. American Bittern. *Botaurus lentiginosus*, Mont.

SCOLOPACIDÆ.

103. Yellow-shanks Tatler. *Totanus flavipes*, Gmel.

104. Tell-tale Tatler. *Totanus melanoleucus*, Gmel.

105. Solitary Tatler. *Totanus chloropygius*, Vieill.

106. Semipalmated Tatler, (doubtful.) *Totanus semipalmatus*, Gmel.

107. Spotted Tatler. *Tringoides macularia*, Linn.

108. Long-legged Sandpiper, *Hemipalma multistriata*, Licht.

109. Schinz's Sandpiper. *Tringa Schinzii*, Brehm.

110. Peep. *Tringa pusilla*, Wils.

111. Red-breasted Snipe. *Macroramphus griseus*, Gmel.

112. Common Snipe. *Gallinago Wilsonii*, Temm.

113. Woodcock. *Philohela minor*, Gmel.

114. Wilson's Phalarope. *Phalaropus Wilsonii*, Sab.

RALLIDÆ.

115. Sora Rail. *Ortygometra Carolina*, Linn. This is not uncommon at Portage Lake in September and October.

116. American Coot. *Fulica Americana*, Gmel. The tatlers, sandpipers, snipes, coots, geese, ducks, and loons, begin to arrive at Portage Lake about the last of April, when only the small streams opening into the lake are free from ice; from this time till the last of May, when the ice disappears, they are very numerous, and are shot in great numbers.

ANATIDÆ.

117. White-fronted Goose. *Anser erythropus*, Linn.

118. Snow Goose. *Anser hyperboreus*, Pall. These are rare, compared with the Canada Goose.

119. Canada Goose. *Bernicla Canadensis*, Linn. Quite common at Portage Lake in the spring.

120. Swan. *Cygnus Americanus*, Sharpless. These birds have been seen flying over, but I have never known of one alighting or being shot in this region.

121. Summer or Wood Duck. *Aix sponsa*, Linn.

122. American Widgeon. *Mareca Americana*, Gmel.

123. Pintail Duck. *Dafila acuta*, Linn.

124. Mallard. *Anas boschas*, Linn.

125. Dusky Duck. *Anas obscura*, Gmel.

126. Green-winged Teal. *Querquedula Carolinensis*, Gmel.

127. Blue-winged Teal. *Pterocyanea discors*, Linn.

128. Gadwall Duck. *Chaulelasmus strepera*, Linn.

129. Shoveller Duck. *Spatula clypeata*, Linn.

130. Ring-necked Duck. *Fuligula collaris*, Don.

131. Scaup Duck. *Fuligula marila*, Linn.

132. Canvas-back Duck. *Nyroca valisneria*, Wils. This duck is occasionally seen here during its migrations, but I could not ascertain that any had ever been shot.

133. Red-headed Duck. *Nyroca Americana*, Pr. Bonap. This species I have often seen and eaten at Portage Lake.

134. Golden-eye Duck. *Clangula Americana*, Pr. Bonap.

135. Buffel-headed Duck. *Clangula albeola*, Linn.

136. Goosander. *Mergus castor*, Linn.

137. Red-breasted Merganser. *Mergus serrator*, Linn.

138. Hooded Merganser. *Mergus cucullatus*, Linn. I have been told by hunters here that there is at some seasons of the year, a nearly white merganser, or "saw-bill," as they call it, in the lakes of this vicinity. From the alleged improbability of the occurrence of the *smew* (*Mergellus albellus*, Linn.) except as a very rare visitor from Arctic Europe, I have not included this bird in my list, though its occurrence is firmly maintained by the Indians and hunters, who ought to know. The bird seen by them may be some white-plumaged duck; though I must say I am inclined to believe that Audubon is wrong in excluding the smew from the American continent, and that Wilson is right in making it not an uncommon bird here.

COLYMBIDÆ.

139. Common Loon. *Colymbus glacialis*, Linn. This is a very common species at Portage Lake, in the spring and summer, and is here possessed of all the shyness peculiar to it in more populous localities. The only way the gunner can approach it in the open lake, where it delights to sport and feed, is to conceal the bow of his boat or canoe with branches of evergreen, and

surmount the leafy covering with a bright flag; behind this screen he can paddle easily towards the bird, whose natural curiosity prompts him to swim towards it to see what the strange object is. By keeping up a shrill whistle at the same time, it is not difficult to get within gun-shot. They are hunted considerably for their skins, of which the natives make bags, pouches, and knife-sheaths.

140. Red-throated Diver. *Colymbus septentrionalis*, Linn.
141. Black-throated Diver. *Colymbus arcticus*, Linn.
142. Crested Grebe. *Podiceps cristatus*, Linn.
143. Horned Grebe. *Podiceps cornutus*, Gmel.
144. Pied-bill Dobchick. *Podilymbus Carolinensis*, Lath.

LARIDÆ.

145. Herring Gull. *Larus argentatus*, Brün. This bird is very common on the Great Lakes, following in the wake of steamers and vessels, and is not uncommon on Portage Lake. There is said to be a smaller black-headed gull there, but I have never seen it above the Saut St. Marie. This is undoubtedly the *Larus Bonapartei*, Rich. & Sw.

146. Common Tern. *Sterna Wilsoni*, Pr. Bonap. There are doubtless other species of terns here.

PELECANIDÆ.

147. White Pelican. *Pelecanus trachyrhynchus*, Lath. One of these birds was seen and shot at on the Point a few years since.

Synopsis of number of Species in the several Families.—Falconidæ, 15; Strigidæ, 7; Caprimulgidæ, 2; Hirundinidæ, 2; Alcedinidæ, 1; Certhidæ, 2; Luscinidæ, 12; Turdidæ, 5; Muscicapidæ, 6; Ampelidæ, 2; Laniidæ, 1; Corvidæ, 5; Sturnidæ, 4; Fringillidæ, 19; Picidæ, 8; Columbidæ, 1; Tetraonidæ, 4; Charadriadæ, 3; Ardeidæ, 3; Scolopacidæ, 12; Rallidæ, 2; Anatidæ, 22; Colymbidæ, 6; Laridæ, 2; Pelecanidæ, 1.

In all, 147 species; of which 96 are land birds, and 51 are water birds. The birds of prey are numerous, and consequently the warblers, flycatchers, and finches are in the proportion necessary to supply them with food. The crow and woodpecker families preserve the usual ratio of cold climates; while the ducks, divers, and beach birds are what we should naturally expect to find in the neighborhood of the largest and finest sheet of fresh water in the world.

Dr. Silas Durkee exhibited two specimens of the Common Glowworm, (*Lampyris noctiluca*,) which were found in Dedham, Mass. He remarked that the Glowworm is not the larva of an insect, but the perfect female of a winged beetle, from which it is so different that nothing but actual observation would lead one to infer that they are different sexes of the same insect.

The specimens exhibited have a small flat head, furnished with antennæ about half a line in length, and when examined with a common pocket magnifier, are seen to consist of two colors, white and chestnut, alternating. They do not appear to have the power of producing or extinguishing the light at will. Their brilliancy is less than that of the *Elater noctilucus*, two specimens of which Dr. D. exhibited several months since. Dr. Durkee said that he had watched these glowworms during an interval of about nine hours, commencing at eight o'clock in the evening. The peculiar faculty of producing light began to show itself between the segments of the body and at the large spiracles or stigmata, which may be seen in connection with the rings; there being two of these spiracula to each segment, and twenty-four in all. From about eight o'clock to midnight, the light along the rings and at the spiracles was much more brilliant than it was through the segments themselves. But during the latter part of the night, the light was equally diffused throughout the entire length of the worm. This was the case in both specimens. And during this distribution of the luminous power, or property, nothing could be seen of the spiracula, or of the segments or joints. The worms appeared as if they were two fused masses of beautiful phosphorescent light; sometimes at rest, sometimes assuming a variety of shapes, according to their slow and graceful movements. The luminous properties were displayed at first through a few of the spiracula and a few of the joints, while all the rest were in a condition like that which is maintained during the day; that is, they yielded no light. This partial illumination, however, soon gave place to the most charming diffusion of light along the whole length of the body, and the latter condition was preserved unbroken until the light of day broke the charm, and these fairy little creatures were transformed into mere worms.

It is said that the light in the female is most brilliant in the season when the sexes are destined to meet. In some species the light is emitted only during the period for propagation.

The Curator of Crustacea and Radiata asked to be excused from the care of the Crustacea, or to have the department divided. He thought there was sufficient labor for two curators, and he could properly take charge of the Radiata only. The subject was referred to a committee, consisting of Messrs. Abbot, Gould, and Whittemore.

James H. Slawson, of Houghton, Michigan, was elected a Corresponding Member.

Messrs. Chas. V. Bemis, M. D., of Medford, and Oliver W. Peabody, of Boston, were elected Resident Members.

August 5, 1857.

Dr. Chas. T. Jackson, Vice-President, in the Chair.

A communication was read from the Georgic Association of Cattaraugus County, N. Y., requesting donations of Publications, Specimens, &c. Referred to the Publishing Committee.

Mr. W. G. Dix, by invitation, read a paper upon Ecuador and its natural productions.

Dr. Head, of the U. S. Army, exhibited a large Hairball, so called, six inches in diameter, taken from the stomach of a healthy ox, on the banks of the Nueces, in Texas. Its surface was smooth, hard, and apparently calcareous.

Dr. D. H. Storer remarked that balls of this character were occasionally found here; not, however, so large as this. Quite a large one from the stomach of a hog, composed of bristles, was sent recently to the Society for Medical Improvement. The hairs are introduced into the stomach in the process of licking the skin.

Dr. H. R. Storer presented specimens of a Smelt from Squam Lake, N. H., remarking on its peculiar interest, as affording an instance of a species originally migrating to fresh water from salt water, and now permanently resident in the former.

Dr. Storer said that he had learned of its existence several years since, but had, until now, been unable to obtain it. When full grown the lake smelt seldom exceeds six inches in length and is extremely attenuated, but a careful examination leaves little doubt of its identity with our marine *Osmerus viridescens.* It is found throughout the year, in both Squam Lake and Winnipiseogee, though more rarely in the latter. The modifications in shape referred to, would probably be found to exist also in the smelt of Jamaica Pond, near Boston, specimens of which had already been presented to the Society; the conditions of life being much the same in both, the latter having been imprisoned artificially, while the former had become a permanent resident in fresh water from natural causes alone.

It was once supposed that the salt water Cusk was found in the New Hampshire lakes, but Dr. D. H. Storer had proved, in the Journal of this Society, that the fishes in question were not only specifically but generically distinct.

Dr. Storer also presented two species of Leuciscus, one of them probably undescribed, from the same locality.

MARYLAND MARBLES AND IRON ORES.

Dr. C. T. Jackson stated that he had recently examined the marble and limestone quarries of Texas, Maryland, for Mr. William Robinson, of Baltimore, and at the same time had visited the quarries in the same town where the marbles now employed in the extension of the General Post-Office and Patent-Office at Washington, were obtained. The marbles at Mr. Robinson's quarries are identical in character with those from the United States quarries above mentioned.

The Dolomite. which is the finer-grained marble, similar to that used in the Post-Office extension, has a density of 2.851, hence a cubic foot of it will weigh 178.187 pounds avoirdupois.

On chemical analysis this stone is found to consist of

Carbonate of lime	59.4
Carbonate of Magnesia	38.5
Carbonate of Manganese and Iron	1.4
Insoluble siliceous matter	0.7
	100.0

The strength of a stone of the neighboring quarry, tested at Washington, was found to be equal to a resistance of 18,061 pounds per square inch. This marble is suitable both for monumental purposes and for architecture. The broken fragments of it make, when burned, a hot magnesian lime, which, when mixed with sand, forms a mortar with some hydraulic properties, so that it is very permanent, and resists the action of water after it is once hardened or set.

The other marble is a coarse-grained white limestone, called by the quarrymen Alum Stone, on account of the large size of its crystals, and their great purity. A stone identical with this is employed in the extension of the Patent-Office buildings. This marble has a density of 2.697, and a cubic foot of it weighs 168.562 pounds. Its strength is equal to a resistance of 8.057 pounds per square inch, according to the experiments made at Washington on a stone identical with this which was taken from a neighboring quarry.

This stone is largely burned for making lime, and furnishes the best quality of pure white lime for mortar and for plastering ceilings. The marble is also employed in building, though it is far inferior in strength to the dolomitic variety before described. On chemical analysis this limestone was found to consist of

Carbonate of lime, - - - - - - - - - -	97.9
Carbonate of Manganese and Iron, - - -	1.8
Insoluble Silica, - - - - - - - - - - -	0.3
	100.0

It does not contain any magnesia, a remarkable fact, considering its close contiguity to the Dolomite.

Dr. Jackson stated he had on this same excursion examined a remarkable locality of Iron Ore, near Whitehall station on the Northern Central Railroad, about 20 miles north of Baltimore.

This locality presented some interesting geological and mineralogical phenomena. The rocks were Talcose rock or soapstone, chlorite slate, and masses of crystallized garnets so closely packed together in chlorite as to resemble a pudding stone in general appearance. The garnets are regular rhombic dodecahedrons, and are generally of the size of grape shot, though some of them are as large as a turkey's egg. The chlorite slate is filled with an impurity of crystals of octahedral magnetic iron ore, and with veins of the granular ore of the same kind. The soapstone generally underlies the iron ore, though it alternates with the chlorite slate in one instance at this mine. The iron ore with the chlorite slate and garnet rock are mined together, and the ore sells at a neighboring anthracite furnace at $3 per ton. Dr. Jackson said that no one would, on looking at the heaps of this ore, conceive it worth any thing for furnace purposes, but on analysis he found that an average sample of the ore yielded 41 per cent. of the per oxide of iron, which is equal to $28\frac{7}{10}$ per cent of metallic iron.

A certain proportion of garnets aids the smelting of the iron ore by their ready fusion and by preventing the absorption of any oxide of iron by the slag even if the garnet itself does not yield, as it probably does, a certain proportion of iron in the smelting furnace.

Dr. C. T. Jackson presented, in the name of W. E. S. Whitman, Esq., of Gardiner, Me., specimens of the shells, (*Alasmodonta arcuata*) which are opened for pearls in that State.

Dr. J. A. Lamson was elected a Resident Member.

The names of Professors W. B. and H. D. Rogers were added to the list of Resident Members.

DEPARTMENT OF MICROSCOPY.

An extract from a letter of C. A. Spencer, of Canastota, N. Y., to Dr. Durkee, was read to the Society.

Mr. Spencer says that he is "manufacturing a new lens, which he calls the 'Orthoscopic Eyepiece.' It is more perfectly achromatized than the old negative form, has a perfectly flat field, and is more luminous. Its cost, he says, is high, (fifteen dollars;) still, he is satisfied it will meet a want long felt by microscopists."

Alluding to some recent examinations of animal tissues with his lenses, in connection with Mr. Clark, Prof. Agassiz's assistant, Mr. Spencer says, "one result of large angles of aperture in such investigations was a gratifying and complete answer to the objections made by some to such lenses. In studying tissues made up of several laminæ or layers, varying, perhaps, *inter se*, in their textures, small angles of aperture give a confused mixture of all the layers at once, and the specific characters of none. We found the large angles of aperture to insulate these beautifully and perfectly,—an effect of course valuable in the highest degree."

Dr. John Bacon exhibited specimens of Foraminifera, from South Carolina, and Polycistina from Barbadoes, belonging to the Bailey collection.

These fossils belong to the same group, and agree in some of their essential characters. The calcareous carapaces of the former are perforated with numerous openings through which the animal protrudes thread-like processes of its body for nourishment. In the latter, the carapaces are siliceous, and, with the exception of these, there are no organisms having siliceous coverings, which have been positively determined to be animal. They have been placed in the animal kingdom from their structure and the albuminous character of their substance, (sarcode,) from their motion, and from the manner of obtaining nutriment, distinct from that of vegetables.

Dr. Bacon also exhibited specimens of Foraminifera and Polycistina found in deep soundings of the Atlantic Ocean.

Mr. C. L. Andrews exhibited specimens of Algæ.

Mr. Chas. K. Stevens, of Lawrence, exhibited one of Spencer's microscopes, to which were adapted a second set of lenses made by Nachet of Paris, and embodying some recent improvements.

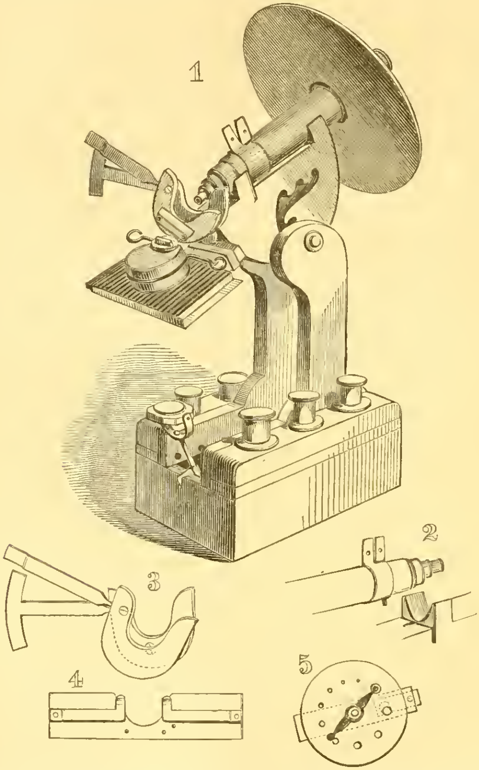
A description of a new stand for the compound microscope was given, and the instrument exhibited by Dr. Oliver Wendell Holmes, as follows:—

The more especial object of this mechanical arrangement is to facilitate the use of the *direct light* of a lamp placed close to the object. Many of our microscopists must have seen Mr. Spencer use a lamp in this way, holding it in his hand and varying the distance and obliquity so as to produce the particular effect desired. The advantages of direct light are its easy management, its brilliant effects, and the more perfect definition it gives of delicate objects. But, inasmuch as the heat and smoke of the lamp ascend, this method of illumination can only be used with the microscope-tube (or *compound body*) in the horizontal or moderately inclined position, unless the lamp be so far removed as to lose its peculiar advantages. It is evident that the lamp cannot be used at all with the tube vertical and directly over it.

If an instrument is to be employed in the horizontal or slightly inclined position, it will require a *stage movement;* otherwise both hands will be needed to move the object, and will even then find it awkward to do so, as the object must be secured to prevent its sliding. Again, if the stage is inclined, and the lamp close to it, it is evident that the broader the stage the more it overhangs the lamp, and the more it is exposed to its smoke and heat. By making the stage open at top, like a horseshoe, we get rid of this difficulty entirely.

An instrument that answers this *special* object alone, namely, the use of direct light, can be made, on the general plan of the one I show the Society, with great ease, and at small expense.

But as it is sometimes necessary or convenient that the object should be placed horizontally and the microscope-tube vertically,—as in examining fluids with low powers, or opaque bodies,—certain additions have been made to this model to render it capable of being so used; reflected light, or the use of the condensing lens being substituted for the mode of illumination for which it is specially adapted. This, of course, involves the expense of a mirror and lens with their adjustments, which is, however, trifling, if the plan here shown is followed.



The instrument is represented in working order in figure 1.

The base of the whole is a box made of black walnut, three quarters of an inch thick, having two uprights, of the same material and thickness, firmly screwed to the inner edges of the strips which partly cover it. On each side of the uprights, over these partial covers, are screwed two thick pieces of black walnut, with holes for the eye-glasses on one side and the objectives on the other.

This box is open at one end to receive a flat-iron or other weight, if required, and to admit the other parts when the instrument is packed.

Between the uprights is received the *bearing semicircle,* made of three pieces of black walnut glued together, the inner one having the grain directed lengthwise, the two outer ones vertically. This is provided with a "slot" partly vertical, partly horizontal, and several notches. A binding screw holds it at any angle and at various heights between the uprights.

The microscope-tube, made heavy by a leaden tube inside, is laid upon two V-shaped supports cut out of the wood, being held solely by its weight when used in the horizontal or inclined position.

The microscope-tube has a ring an inch wide, fitting tight, but becoming loose on pressing its handles, and having a little projection, or spur on the side opposite its handles, as shown in figure 2.

The anterior V-shaped support is also shown in this figure. It has a piece of brass let into the wood for the spur on the ring to play against. As the posterior surface of this support is slanted about one sixteenth of an inch, it is evident that in turning the tube through a semicircle it will advance or recede that distance. This turning of the tube is performed by means of the black pasteboard disk clasped to the tube near the eye-piece, which makes a sufficiently delicate fine adjustment.

The horseshoe stage consists of two pieces of brass, cast and planed, 4 inches across at the widest part, and 3 inches in height. The first, nearest the observer, turns on a screw at the centre of its semi-circumference against a brass plate screwed to the bearing semicircle. The second turns on a screw which unites one of its arms—the right—to the corresponding arm of the first horseshoe. The first horseshoe therefore carries the other with it; the second *turning very easily,* is moved independently of the first. The handles are flat, the one with the cross next the observer, the other projecting three quarters of an inch beyond it, so that a slight change of the thumb determines whether one alone shall move, and the object be carried up and down, or both, and the object move from side to side. Figure 3 shows the principle of arrangement, and figure 4 the object-holder with its springs, which is held against the horseshoe by a piece of brass plate screwed upon the latter, as shown in figure 1—the object-holder sliding between the two. The tray that holds the lamp is of sheet-iron, 5 inches by 3, with a ledge of half an inch in width at its remote edge. On this tray rests a thin piece of wood of the same size, covered with velvet. The lamp having its base covered with velvet also, cannot slide off, even when the microscope is much inclined,—but the lamp, with the piece of wood on which it rests, is easily slid from side to side.

Fig. 5 represents the diaphragm with the achromatic condenser. This is arranged in place by sliding its foot under a spring upon the same piece of wood to which the tray for the lamp is fastened.

The dimensions of various parts not yet given are as follows: *Inside* dimensions of the box, length 8 inches; width 5; height 2; from bottom of inside of box to binding screw, 11 inches. Distance between uprights $1\frac{5}{8}$ inch. Bearing semicircle same thickness. Radius of this semicircle $3\frac{1}{4}$ inches. Object-holder $7+2$. Diaphragm 3 inches in diameter.

If desired to use the microscope in the vertical position, the tube must be held firmly against the supports, the tray removed, and the mirror represented in figure 1 brought into its place. A loose ring of plate brass capable of being made fast to the bearing semicircle serves to fix the tube. The mirror is a plane one, set in an open frame. If a plano-convex lens is placed over it, it acts like a concave mirror; if the mirror is removed the same lens may be used as a condenser.

In packing this instrument, the tray and diaphragm go at the bottom of the box, the bearing semicircle is held by the binding-screw between the uprights, and the pasteboard disk is held at the side of one of the uprights. The lamp and other accessions go into the box.

The leading peculiarities and novelties of the instrument will now be indicated.

1. Union of stability and portability. The base gives a suffi-

cient degree of steadiness for common purposes. But by sliding a common *flat-iron* into its interior it becomes as firm as the most ponderous instruments of Ross, which are too heavy to be carried about with comfort.

2. The facility with which the *height* of the compound body, as well as its inclination, may be varied by means of the "slots" and notches in the bearing semicircle.

3. The mode of focal adjustment by rotation of the tube, or compound body. This has a movable ring upon it with a projecting spur, which bears against the slightly inclined posterior surface of the anterior V-shaped support of the tube. The disk which protects the eyes is used as a lever, and thus a very smooth and uniform motion without the smallest amount of "lost time" or "back lash" is obtained without rack and pinion, spring or screw.

4. The open horseshoe stage, with the movable object-holder received upon its remote (anterior or inferior) surface, the glass object-slide being itself pressed by springs against the remote surface of the object-holder. It follows from this arrangement, 1st. That if one object is in focus, all others mounted in a similar manner are in focus, or very nearly so; 2d. That the thickness of the stage becomes practically reduced to nothing, as the glass slide is next the lamp, and behind, or below, every thing except the springs that press it forward against the remote face of the object-holder.

5. The double *radial* stage-movement. The horseshoe piece next the observer turns from side to side on a screw passing through the lower or middle portion of its arc. The other horseshoe piece turns on a screw fixing it to one arm of the first, so that it moves up and down. The arcs they follow form so small a part of a circle that the eye cannot distinguish their movement from a rectilinear one. The *bolt and crossbow* flat handles, working singly or together, make the management of the stage movement very convenient.

6. The flat-wicked lamp, so mounted as to move freely without the possibility of slipping, at whatever angle the apparatus may be inclined.

7. The combination of mirror and lens in an open frame, so as, by slight alterations, to serve a triple purpose; that of plane mirror, of a condenser, and of a substitute for the concave mirror.

8. The simple and effective mounting of the achromatic condenser and the diaphragm attached to it.

It remains for others to determine if any or all of these innovations are improvements.

August 19, 1857.

Dr. Chas. T. Jackson, Vice-President, in the Chair.

Dr. D. F. Weinland read a paper entitled—Some Points in the Zoology of Hayti,—as follows:—

A few weeks since I returned from nearly half a year's sojourn on the southwestern neck of that beautiful mountain-island, (this is the meaning of the Indian name Hayti,) and I wish to communicate to my scientific friends some of my impressions and observations,[1] whilst they are fresh in my mind, even if they should yet lack the stamp of elaboration.

I shall speak first of the organic life of the sea-shore, and since this depends upon the geological formation of the coast, and upon the nature of the sea, these subjects will first be introduced.

I. THE SEA-SHORE.

The northern shore of the southwestern neck of Hayti is mostly *côte de fer*, that is, an iron-bound coast. There are but few small sandy bays, which serve as landing-places for the fishing boats, and near them are generally found huts of fishermen, or a small village.

The rock which bounds all the rest of the coast is a hard brittle limestone, formed very generally of a conglomeration of madrepores and other corals, as Astrææ, Mæandrinæ, Milleporæ, etc. and of various kinds of shells, cemented with a mass of smaller and formless lime-particles, the powdered particles of the same corals and shells. This rock is full of pores and roundish cavities with sharp edges, perhaps the places where softer shells or fragments of corals have been washed out by the erosion or attrition of the water, or knocked out by corals, thrown up in the stormy winter season of the furious north wind. The species of corals and shells which enter into the composition of this rock, I found nearly all alive in the adjoining sea. Some of them, however, have disappeared from among the living; others are dying out, and are now very rarely found, though common in the earlier portions of the present period; for they exist in great quantities in the rock at the depth of a few feet. Such animal remains enclosed in rock, yet belonging to species now living, or to species now extinct, but which lived in the earlier ages of this period, together with species now living, we are accustomed to call modern fossils. They are the more interesting because they show how, without any remarkable revolution of our globe, certain species of animals gradually die out.

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[1] Most of these observations were made in company with my friend Mr. Edward Habich of Boston, a member of our Society, on our daily walks along the sea-shore, or during our excursions up the rivers or back in the forests of the interior.

The same rock, composed of modern fossils and their detritus, I found in the interior mountain regions of the island, about thirty miles from the sea-shore, and at a height, as I should judge, of at least one thousand feet above the present level of the sea. Indeed, the whole first, that is, northernmost, ridge of mountains which runs along that northern sea-shore of Hayti, from east to west, is crowned with large layers or broken masses of this same kind of rock, which being, as stated above, a formation of the present geological period, goes far to show that this whole ridge has been raised in this present period. Thus the existence of the greater part, and the configuration of the whole of the southwestern neck of the island of Hayti is of a comparatively recent origin.

Two questions at once suggest themselves here, *whether the formation of the same rock, and whether the elevation of the land, are going on at the present time.* That the former, the formation of the same limestone rock, is really in progress at the present day, seems to be evident in some places, where the whole bottom of the sea near the shore, at a depth of from one to five and six feet below low-water mark, is, as it were, a flat pavement of the same kind of rock. Crust-building corals, as Porites, Mæandrinas, Siderastræas, etc. live upon it, and in the interstices of these are thrown up from below dead shells, broken Millepores, Madrepores, and

Astræans. By the powerful action of the waves on the shallow bottom, these remains are broken and ground upon each other, and their form is lost.

The lime powder which results from this pulverizing action furnishes the cement which fills the shells and unites the pieces into one solid mass, *Maçonnerie bon Dieu* (God's Masonry) as the negroes of the French colonies call it. In consideration of these facts the first part of our question may be answered in the affirmative.

But whether the whole coast is constantly and gradually rising, (as we know is the case with the coast of Sweden,[1]) or whether those different layers of that submarine pavement have been thrown up at various periods, by sudden volcanic agencies, I am at a loss to decide from my own observations. I will only state that the layers which lie now just above low-water mark, are (for instance, in some places in the neighborhood of Jeremie) quite undisturbed banks, running in a plain parallel to the level of the sea. This seems rather to favor the idea of a gradual rising than of a sudden upheaving, and the latter would be more likely to fracture the layers and to change their original horizontal position into an angle towards the horizon.

I conclude, from the information afforded me, that this limestone formation must extend over the whole northern part of Hayti, from its western cape (Tibouron) to the neighborhood of Port-au-Prince. Further, the rocky part of the sea-shore of Barbadoes, Maria Galante, of Grand-terre in Guadaloupe, of Antigua, St. Bartholome, St. Martin, Arguilla, and Santa Cruz, seems to be of the same composition and age. I should judge so, also, from an account of William Maclure, published just forty years ago in the Journal of the Academy of Natural Sciences of Philadelphia, vol. i. p. 134, *et seq.* Further also, the honeycomb limestone of Jamaica is the same rock, according to a communication of my friend Dr. Hyde,[2] who lived in that island for many years.

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[1] According to the observations of Leopold von Buch, Hallstroem, and Lyell, the whole northern coast of Sweden and that of Finland is continually rising at the rate of four feet in a century. See also Humboldt's Kosmos, I. p. 315 and p. 472, *et seq.*

[2] Dr. J. S. Hyde, of New England, a zealous and experienced conchologist, by whom were collected many of the Jamaica land-shells, which were described by

I have not yet had an opportunity to look for other geological reports of the Antilles. I suppose, however, that this is the same limestone formation, which the negroes in Guadaloupe very appropriately call "God's masonry," and which is so evidently a formation of modern time, since it encloses instruments made by man, and even those once celebrated, supposed fossil human skeletons.

If we want a name for the Haytian limestone described above, we might call it the modern "Coral-rag," for if it had not been for the difference in the fossil remains, I should have recognized it as exactly the same limestone, which forms those steep, porous rocks of the so-called rough Alps of Southern Germany, between the Danube and Rhine. Indeed, it was not a slight pleasure for me to see here clearly, how those old rocks of my home must have been formed in their time, millions of years. ago, when Southern Germany was yet an island not much larger than Hayti, having a warm climate, and surrounded by a warm ocean ; and presenting, all along the coast, the same banks of corals ; and in the cavities of these rocks the cidarites, which abounded then, and of which I found one species alive in Hayti. But this also is so scarce as to show that its days have passed.

II. THE SEA OF NORTHERN HAYTI.

Beyond the formation of the coast there are some features connected with the sea, which borders upon the northern side of that island, which are of the greatest importance to its animal and vegetable life.

1. The great respiration of the ocean, the ebbing and flowing of the tide, hardly touches that coast. Neither the native fishermen along the coast, nor the American captains in the harbor speak of high and low water there. The great tide wave is not only broken by the wall of islands in front of the Mexican Gulf, but, perhaps, is even neutralized by a continual current, which runs from east to west all along the northern shore of Hayti.

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the late Prof. Adams, tells me that he found this limestone, particularly in the northern part of that island. He noticed it for its peculiar richness in Cyclostomas, which live in the cavities.

[2] See Humboldt's Kosmos, I. p. 260.

2. All the motion of the sea on that shore depends upon the wind. Its agencies are twofold; first, *the daily change of sea and land wind*, the former beginning to blow in the morning about eight o'clock, the latter in the evening between six and nine. The latter is much more constant, and being also more powerful, it depresses, every evening, the level of the sea all along the coast from one to two feet. But there is, secondly, another, a *yearly change of the winds*, viz: a prevailing northerly wind in winter, particularly in December, January, and February, and a prevailing southerly wind in summer. This great change produces this effect, that in the season of the North, as they call it there, the level of the sea is constantly, on the average, eight feet higher than in summer.

How much this change bears, also, upon the organic life of the sea-coast, is evident. I will only state that during the last week of May and the first of June, in one place not larger than an acre, more than a hundred Actineæ and Holothuriæ died, because left upon dry land; not to speak of the thousands of other animals, fishes, echini, etc., and of sea-plants which died in those natural basins near the sea, where the water, cut off from the refreshing ocean, was overheated by the nearly perpendicular rays of the tropical sun. The rising of the land from the waves, the same that we know took place repeatedly in the great epochs of the history of our globe, and which, as Dr. J. D. Dana once said, brought death among the sea tribes in one universal desolation,—the same we see now on the northern shore of this island, repeated annually with the change of the winds; and though on a smaller scale, yet destroying hosts of living organisms. Moreover, in that stormy season of the North, the whole bottom of the ocean, all along the shore, at more than five fathoms depth, is swept, and not only all the dead remains but many living shellfishes, and large blocks of corals, are dashed against the iron-bound coast and thrown up on dry land. This is the season dreaded equally by the Haytian coasters and the merchant vessel in the harbor. The former, when overcome by a dark, stormy night, without a compass, an instrument unknown to them, are driven helpless along the shore, and their small boats frequently thrown against the rocks. The latter, the merchant vessel, drags its anchors on the moving bottom of the sea (called *rade marée*) and runs ashore.[1]

Besides the motion of the sea, there is one circumstance more worthy of notice, as bearing upon the organic life of this sea-shore. It is the *chemical composition of the sea-water*. The sea-water contains, at this distance (about eighteen degrees) from the equator, the greatest amount of salt in solution; more than the water near New England, and a good deal more than the sea immediately under the equator. This remarkable fact has been shown by Linz, a German scientific traveller, on his voyage round the world.[2] The rivers of the northern shore of Hayti are not large enough to exert an extensive influence upon the composition of the sea-water, even in the immediate neighborhood of their mouths, and, moreover, they are generally barred up by sand-banks during a great part of the dry season. These sand-bars prevent again a large pouring in of sea-water into the river, and thus the river water is quite fresh and sweet in the immediate neighborhood of the sea, so much so that vessels take in their drinking water there. But notwithstanding this, (and it is an interesting physiological fact,) I found relatively more sea-fishes going up annually from the sea into these rivers, than ascend the German rivers; showing how flexible their nature must be to bear the sudden change in the saltness and density of the water, when passing from that deeply saline ocean into fresh water. The case is different with those sea-fishes of New England and Germany which enter rivers; they have always to pass through brackish water, and thus the change is effected gradually.

(*To be continued.*)

Dr. C. T. Jackson said that he had found in analyses of sea-water from coral regions a greater amount of carbonate of lime than is found in water from other parts of the ocean. He supposed it to be derived from the decomposed corals, rather than a natural ingredient of the water and the source of coralline growth.

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[1] In the harbor of Jeremie, which is not protected against this north wind, two vessels ran ashore at one time during one of the last winters. This occurs nearly every year.

[2] See Humboldt's Kosmos, I. p. 320, where we find also the reason for this remarkable phenomenon.

Dr. Jackson exhibited the shells (*Alasmodonta arcuata*) which were presented at the last meeting by W. E. S. Whitman, Esq., of Gardiner, Me. This species is found in the rivers of Kennebec county, and being lined with a pearly secretion, the shells have been sought for in that neighborhood for pearls. The thanks of the Society were voted for the gift.

Dr. Weinland called attention to the fact that the outer surface of the shells, near the hinge, was considerably eroded, and he referred to a communication of Dr. James Lewis, of Mohawk, N. Y., read to the Society February 18, 1857, in which the presence of saline alkalis is assigned as the cause of erosion by that gentleman, contrary to an opinion expressed by himself in a paper read to the Society October 15, 1856. He disagreed with Dr. Lewis upon this point, for he believed that the animal absorbs from the water only such substances as are suited to its nature.

Dr. A. A. Hayes stated that where the composition of the water is changed at different seasons of the year, there is great liability to erosion. He attributed the effect to the presence of organic acids, as humic and ulmic acids or mixtures of the two, which he said were at certain times sufficiently strong to attack the epidermis of the shell. He referred to changes in the Connecticut, Concord, and Schuylkill rivers, the last two of which have been so much altered in their composition by impurities introduced in mining operations or otherwise, as to render them more or less destructive to animal life.

Dr. Weinland remarked that he could not believe any waters to be so strongly acid as to be capable of destroying the epidermis. In his paper referred to above, which he had read to the Society, he had maintained that the first step of the erosive process was the destruction of the epidermis by a worm.

Dr. Jackson thought from the appearance of the smallest perforations that the destruction of the shell originally commenced with a worm.

Mr. T. J. Whittemore observed that the shells in Fresh Pond

Cambridge, are eroded, whilst those in a stream near the pond are unaffected except in certain portions of it where there is a clay bottom. In the Middlesex Canal they are free from erosions, but in Concord River the opposite is the case.

Dr. Weinland said that the observation of Mr. Whittemore sustained his view of the question. The worms which infest the shells do not live in sandy bottoms, and he had generally noticed the erosion of the shells to extend just so far only as they are imbedded in the clay.

Mr. C. J. Sprague called attention to the fact that the corroded surfaces are in some instances covered with epidermis, which may have been a new growth from the neighborhood of the hinge.

Dr. Jackson said that he had frequently seen the animal taken out of the shell by the mink or musk-rat, the sun having previously killed the animal and expanded the shell.

Mr. Whittemore said that the common belief, that the musk-rat brings out the mollusk from the water, and leaves it upon the shore in the heat of the sun for this object, is probably true.

Mr. F. H. Storer exhibited crystals of Sulphide of Lead obtained by sublimation; one of the accidental products of a smelting furnace in Germany.

He remarked upon the exceedingly great volatility of this compound of lead, and upon the influence which its presence in the atmosphere, even at a great distance from the furnace, exerts upon the vegetation of the region. It has been shown by analysis that large spruce trees, six or eight inches in diameter, contain lead, even in their innermost parts, which had evidently been taken up by the roots.

Dr. C. T. Jackson gave an account of the Sand-Sharks which are caught near Nantucket. While upon the island recently, he had seen some brought to the shore eight or nine feet in length. From the liver is extracted on an average a gallon of oil, which is used by curriers, and worth seventy-five cents a gallon. The body is used for manure.

Dr. Jackson presented, in the name of Amos Otis, Esq., a brick of peculiar shape, and apparently imperfectly made, which was found at Monamet, near Sandwich. It came from a locality, interesting in a historical point of view, as having been the spot where the Pilgrims built a trading-house in the year 1627. The thanks of the Society were voted for the gift.

Mr. C. K. Dillaway exhibited the tooth of a Narwhal, (*Monodon monoceros*, Lin.) It was about seven feet in length, and a very beautiful and perfect specimen.

Messrs. Thomas R. Sullivan and Joseph Willard, Jr., were elected Resident Members.

September 2, 1857.

The President in the Chair.

Mr. Theodore Lyman read the following paper on a new species of Coral :—

In October, 1848, and April, 1849, Milne Edwards and Jules Haime published two monographs on the Astreidæ, (Annales des Sciences Nat. 3ème Série, tom. 10 et 11.) Under this name they included only a part of the Astræans of previous authors, namely, such only as had platforms or dissepiments between the lamellæ, and these they call *traverses.* They further divided the family into two sub-families, Eusmilinæ and Astreinæ ; the former comprising those with smooth-edged lamellæ ; the latter, those whose lamellæ bore teeth. Descending to genera, they subdivided these to a very great extent. Dana's Genus Euphyllia is separated into nine groups ; Lamarck's Genus Astræa, as understood by Dana, is multiplied to nearly twenty ; and, in addition, there are added to the family some forty or fifty quite new genera, many of them comprising only fossils. To sum up ; the family to which Dana, in 1847, apportioned *thirteen* genera, appeared, the year after, under the auspices of Edwards and Haime, with about *eighty*. The comparison, philosophically conducted, of these two classifications, would be of the highest interest, but I speak of them now only in connection with a new species of Astræan, recently fallen upon, in arranging the cabinet of this Society. Its discovery furnishes one more proof of the absolute necessity of some laws, plain and sure, by which classification may be determined. A description of the coral will show the difficulties under which a naturalist must, in such a case, labor.

ASTRÆA DECACTIS, Lyman.

Polyps *short* and budding from the upper edge; consequently the corallum takes the form of a thin plate, which, in this case, is somewhat wavy, and has a few swellings on its surface. A ground surface shows the corallum, between the calicles, to be solid, with a few very small pits, or vesicles; this is generally the case, but, where the calicles are a good deal crowded, the intervening corallum is made up of a double row of vesicles. The calicles, when not crowded, are nearly round, but each is surrounded by a fence of grains, which takes the form of a more or less regular hexagon. These grains cannot be seen without a lens; there are generally about five on a side, (in all about thirty,) and the fence, which they form, is situated midway between each calicle and its neighbors. The calicles are from one half to three quarters of a line in diameter, and are remarkable, not only for their small size, but also from the fact of their having only *ten* stout lamellæ. These lamellæ are sensibly smooth on their sides and edges, (and the species would thus come under the Sub-Family Eusmilinæ of Edwards,) they are considerably exsert, and extend outward a little beyond the edge of the calicle; inwards, they run to a point nearly half-way to the centre, when they pitch suddenly downwards and become thinner; at the centre they all join a solid columella, which has an oval form, and projects above the level of the lamellæ, at their point of juncture with it. On examining a calicle with a strong lens, there may sometimes be seen, on the edge of the calicle and midway between the lamellæ, fine points, or grains, whose size does not exceed that of the grains of the *fence*. Although these bear no sort of proportion, compared with the ten strong lamellæ, still, for reasons that it would take some time to tell, I am inclined to look on them as true lamellæ, in a rudimentary stage. In some calicles they cannot be discovered at all; in others there are two, and, in rare instances, there are as many as ten, or one between each pair of large lamellæ. A vertical section of a calicle shows the characteristic dissepiments (*traverses*, Edw.) of a true Astræan, and a styliform columella, which continues nearly, or quite, to the bottom, though with a diminished size towards its lower extremity. In this species the columella gives the same indication of a bilateral symmetry that is shown in the elongated mouth of Actinia, and, among the Halcyonoids, in that of Renilla, &c. In a line with the longest diameter of the columella there are, almost always, two lamellæ, and, on each side of the axis thus formed, four lamellæ symmetrically arranged; and it is to be further observed, that the calicle itself has a tendency to elongate itself in the direction of this axis. The corallum is covered underneath with a thin, slightly folded epitheca; and above it has a rough look, under a lens, by reason of its crowded calicles, and stout, exsert lamellæ.

Now, as regards the place this species should occupy among Astreidæ, if we go by the system of Dana, it would come under the Genus Astræa, and would be among the species of the Sub-Genus Orbicella, from which it differs only in the less numerous rays. If, on the other hand, we refer to Edwards and Haime, we find that it agrees with no living genus, but is very near to, if not identical with, the Genus Astrocœnia, which is entirely fossil, and, with the exception of one species, does not rise higher than the chalk. With this genus it agrees in growing in a plate; in having an epitheca a little folded; in marginal budding; in polyps soldered by their walls; in a solid, styliform columella; in having thick lamellæ, and in having small calicles. If the genera of Edwards are really to be admitted, it would be curious to see this old *habitué* of the chalk once more among the living. A description of the genus will be found in the Annales des Scien. Nat. 3^{éme} Série, tome x. page 296, and figures in the Paleontographical Society Monograph on British Fossil Corals, 1850, Part I. Plate 5; and in Denkschriften der Akademie zu Wien, vol. 7. Reuss über Kreideschichten, Plates 8 and 14. Of these, the *A. magnifica*, figured by Reuss, resembles most the present species. Considering, however, that the genera of Edwards have been looked on with some misgiving, by more than one good authority, and particularly in respect to the characters taken from the teeth of lamellæ, and the so-called columella, I deemed it safer to leave this species, for the present, among the members of the Genus Astræa, as received by Dana; though, at the same time, I feel pretty sure it will have to be removed therefrom, as soon as the classification of polyps is better understood.

The specimen from which this description was taken was growing on a sponge. The plate was about 2½ inches long, 1½ inches broad, and 3 lines thick, at the thickest part. The edges of the plate were in some places very thin. Dr. A. A. Gould thinks the sponge a West Indian species, and this, combined with the fact that it was in the same case with Mr. Bartlett's Florida collection, makes it very probable that this species inhabits Florida.

The President gave a brief account of some facts noticed during a recent visit to Surinam.

The committee appointed to consider the expediency of dividing the Department of Crustacea and Radiata, reported in favor of the project, and the report was adopted.

H. R. Storer, M. D., was elected Curator of Crustacea.

Messrs. James H. Weeks and George N. Faxon were elected Resident Members.

DEPARTMENT OF MICROSCOPY.

Dr. John Bacon exhibited three different forms of oxalate of lime, occurring as a deposit in the urinary secretion, remarking that they were interesting in a pathological point of view, as well as from their chemical relations. They were, first, the ordinary, apparently octohœdral form; secondly, the rare dumb-bell form;

and, thirdly, crystals which he had now seen for the first time, six-sided tables, often very thin and transparent, and resembling cystine in appearance. They were accompanied in the specimen by thicker rhombic tables, more or less modified, and he considered them all modifications of rhombohœdrons.

He also exhibited crystals of oxalate of lime from the vegetable kingdom. Prof. Bailey called attention some time since to the large amount of oxalate of lime existing in the bark of certain trees, the principal ingredient of the ashes of which was carbonate of lime, a salt arising from the decomposition of the oxalate and other organic salts of lime. This excretion from the human body Dr. Bacon has noticed to be quite common in Boston, but it cannot be due to the use of water containing lime salts, for the Cochituate water is now almost universally used, and this, it is well known, is one of the purest of pond waters. He would not even consider a small amount of oxalate of lime deposited from the urine as a morbid indication, for this salt is so insoluble that a precipitation of it in a certain quantity may be regarded as not inconsistent with health.

An ingenious instrument, in brass and steel, for making fine sections of wood and other articles for microscopic examination, was presented by Edward C. Cabot, Esq., and the thanks of the Society voted for the donation.

September 16, 1857.

The President in the Chair.

Mr. Charles Stodder read a paper on the vibrations caused by the falling of the water over the dam at Hadley Falls, as follows:—

A paper was read at the Montreal Meeting of the American Association for the Advancement of Science, on the vibration caused by the falling of the water over the dam at Hadley Falls, The same matter has been the subject of discussion in this

Society, by Messrs. Briggs and Desor in 1850, (Proc. vol. 3, p. 287,) and by Mr. Briggs in 1852, (vol. 4, p. 185.)

The only cause for the phenomenon that I have seen assigned is the agitation of the air, behind the falling sheet of water. This theory is effectually disproved—if there were no other reasons against it—by the fact cited by Mr. Briggs, of the dam at Lewiston, where the water falls over an inclined plane, leaving no space for air under it; yet the vibrations are very decided.

The case of Hadley Falls seems to have attracted more attention than elsewhere, as probably the vibrations are more powerful, and have been noticed at greater distances than in other places. I expect to show that the causes of the vibrations are there found nearer a maximum, and the intensity and force of the vibrations, as well as the distance at which they are felt, ought to be greater there than at any of the other places which have been referred to.

The dam at Hadley is 1,000 feet long, at nearly right angles to the current of the river, and causes a vertical fall of thirty or thirty two feet. The water does *not* fall in an even stream from the summit of the dam to the surface of the water below, but the upper surface in section presents to the eye a waved or curved outline. This appearance I have noticed at Hadley, Nashua, Lawrence, and at every other vertical fall which I have ever seen, when under the proper conditions to exhibit it. If we could see the under side of the sheet, we should find, undoubtedly, corresponding appearances on that side. This phenomenon is caused by the property of falling fluids, by which they assume the globular form, which may be seen in the Kauterskill Falls, on the Catskill Mountains, where the whole body of falling water is broken into spray and drops—in the fall of water from the jet of a fountain, and in water flowing from a vessel. In all cases, if the water falls a certain distance, proportioned to its mass, the whole will assume the globular form, and become drops. Applying this principle to the fall over an artificial dam, the water at the very commencement of its descent begins to assume that form, and the further it descends, the nearer it approaches it. In passing over an artificial dam, like that at Hadley, the water presents a uniform depth throughout the whole length of the dam; and if we imagine the current of water to be an infinitude of small streams, of uniform depth, in contact with each other, each having the same tendency, the result must be to produce swellings and contractions throughout the whole extent of the dam. Now, when each of these waves strikes the bottom, it gives a blow proportioned in force to the body of water falling from the height of the dam. A certain depth of water running over the top of the dam must fall a certain distance before it would be entirely separated into globules. The smaller the quantity of water, the less distance is required ; consequently every variation in the depth of the water causes a variation in the size and distance of the waves, or tumors ; each of these causes a concussion proportionate in intensity to the weight of water in it, and proportionate in rapidity to their distance apart.

These effects of falling water should be expected, in general, only in artificial falls, such as mill-dams. In natural falls, it is rare that a vertical face is presented for the water to fall over ; and even if such a fall is presented, it is usually formed of angular rocks, causing various depths of water ; and as every variation of depth alters the conditions, the space required to form the tumors in, there would be no coincidence among the tumors formed in different parts of the falling stream ; so that the waves of one part would strike the bottom, in the intervals of those of another part, and thus the concussion of one neutralize the other. Again, to produce the vibrations, the stream should fall from an equal height throughout its width. If one part falls thirty feet, and another twenty-five feet, the same result is produced as by different depths of water. For this reason I conclude that vibrations are not conspicuous at Lawrence. There the dam is diagonal to the stream, and there is considerable difference in the height of the fall, at the two ends of the dam. At Hadley the conditions for causing vibrations are, if we cannot say at the maximum, at least the most favorable of any we know. The height of the fall is considerable—great for an artificial work—and so is the width of the stream. The height is uniform from side to side. The dam is one right line from bank to bank, the bed of the river is solid rock, an almost level floor, free from loose or piled up masses. The top of the dam is perfectly level. Consequently there is an uniform depth of water passing over the whole length, falling an uniform distance. The waves or tumors of the falling water are uniform, and strike the bottom with synchronous concussion from one end of the dam to the other. It is not surprising that the earth should be felt to vibrate in Springfield, seven miles in one direction, and in Amherst, fourteen miles in another.

Another interesting line of inquiry arises here. Hadley Falls, Springfield, and Amherst, are all situated on the red sandstone of the Connecticut valley. I will venture to say that the vibrations have not been felt beyond the boundaries of that rock on either side of the valley. Further between Amherst and Hadley we have the intruded trap, forming Mount Holyoke. This trap is said by Prof. Hitchcock not to be a dyke, crossing the strata of sandstone, but to be interposed between the beds of sandstone. This of course is the interpretation of such parts of the trap as can be examined, but the trap might have cut through the strata of sandstone at some great depth, and only be interposed between the strata near the surface. I believe the fact that these vibrations have been felt beyond the trap rock, indicates that it does not cut off the strata of sandstone at any great depth—that, if it did so, it would cut off the vibrations. Now if the trap lies entirely between strata of sandstone, it may not have been injected, but it may have been poured over the surface of the underlying stratum when that was the uppermost.

Dr. C. T. Jackson, instancing the vibrations noticed at the Dam at Nashua, stated, that, in that place, the vibrations only take place when the wind is in such a direction as to break the fall, and permit of the escape of air, which is evidently confined behind the sheet of water.

Mr. Theodore Lyman read an extract from a letter of Mr. Bowerbank of London, acknowledging the reception of some sponges sent him by the Society, and promising to send a collection of sponges in return. Mr. B. is desirous of obtaining specimens of a spongilla which he says he learns is common in the Cochituate water-pipes of Boston.

Dr. Gould said that he had frequently seen a species of spongilla in these pipes.

Dr. C. T. Jackson said that specimens could be obtained at the Brookline reservoir gates. They are of a yellowish green color.

Dr. J. B. S. Jackson said that he had met with small specimens in the pipes of his house, perhaps two or three lines in diameter, and seven or eight in length.

Dr. A. A. Gould said he had received a letter from Prof. Dawson of Montreal, stating that there had recently been a slide in the neighborhood of that city, by which many new species of tertiary fossils were exposed, and amongst them some spiculæ of sponges.

Dr. J. B. S. Jackson exhibited specimens of Dermestes and a block of wood, forming the support for an anatomical preparation, into which wood the insect had eaten. He was not aware before that this animal attacked wood.

Dr. C. T. Jackson presented, in the name of Samuel Swan, Esq., some specimens of the common Water Lily, (*Nymphœa odorata.*) They were procured from a pond in Yarmouth, Mass., and were peculiar in this respect, that the flowers were of a delicate pink color, instead of being, as ordinarily, white. Dr. J. had noticed, several years since, in Mossy Pond, in Lancaster, this same lily with flowers of a deep red color. He suggested that they were probably only varieties of the same species produced by ferruginous or other modifications of the soil in which they grew.

The President exhibited some species of fishes from the Surinam River, and mentioned some conditions, heretofore unnoticed, under which the eggs are developed.

In a species of Bagre, called by the negroes "Ningi-ningi," the eggs are carried during the whole period of development in the mouth. During the month of June, the females have their mouths filled with eggs, and the young may be seen in all stages of formation, if a large number of individuals is examined. There are at least four species of Siluroids which have this habit.

The Aspredos, or "trompettis," likewise have a peculiar mode of gestation, analogous to that found in Syngnathus. In Aspredo the eggs are attached, by means of pedicles surmounted by cups, to the under side of the abdomen, as far forwards sometimes as the mouth, on the sides to the pectoral and ventral fins which they sometimes cover, and as far back as the middle of the tail. Valenciennes describes the appendages which support the eggs of Trompetti, but nowhere expresses the opinion that they were destined to carry eggs. After the eggs are hatched the pedicles are absorbed.

A specimen of *Hylodes lineatus* was also exhibited, showing the manner in which the young are carried upon the back of the parent. In Hylodes, we have one extreme of a series which commences with Pipa, where each egg is carried in a separate pouch in the back of the female; in Notodelphis, as shown by Dr. Weinland, all the eggs are carried in one dorsal pouch; in Alytes, the eggs in strings are wound round the legs, and finally, in Hylodes, the tadpoles adhere to the back of the parent without any protection. Though having all the organization of a tadpole, viz: gills and a tail adapted to swimming, they are found in the woods on the back of the parent at a distance from water. The early stages of development are unknown.

The habits of Hylodes, as well as those of the fishes above referred to, are well known to the negroes of Guiana.

DONATIONS TO THE MUSEUM.

July 1, 1857. Nest and Eggs of Baltimore Oriole, *Yphantes Baltimore;* Bobolink, *Dolichonyx orizivorus;* Maryland Yellow-throat, *Trichas Marilandicus;* Barn Swallow, *Hirundo rustica;* Cedar Bird, *Ampelis garrulus;* Lesser Pewit Flycatcher, *Muscicapa fusca;* Wilson's Thrush, *Turdus fuscescens;* Blue Jay, *Cy-*

anocorax cristatus; Eggs of Spotted Tatler, *Totanus macularius;* Passenger Pigeon, *Ectopistes migratorius;* Nest of Chimney Swallow, *Cypselus pelasgius;* by Francis S. Williams, Esq. Scarlet Ibis, *Ibis rubra;* by Mrs. Curtis B. Raymond. Petrified Wood and Bone; by S. A. Green, M. D. Geological Map of the United States; by Jules Marcou. Shells from the Cape de Verde Islands, Cuba, and the Western Coast of Africa, and Volcanic Matter from the Cape de Verdes; by Mr. N. H. Bishop. A Crawfish from North Carolina, Vitreous Copper Ore, and Argentiferous and Auriferous Galena from the same State; by Dr. C. T. Jackson.

July 15. Ripple Marks in Sandstone, Algæ, and Parasitic Shells; by Dr. S. Kneeland, Jr. A Horned Toad from Texas; by Mr. Ainsworth.

August 5. Specimens of the shell, *Alasmodonta arcuata*, which is opened for pearls in Maine; by W. E. S. Whitman, Esq. Specimens of a Smelt, *Osmerus viridescens*, taken in Squam Lake, New Hampshire, and of two species of Leuciscus, one probably undescribed, from the same locality; by Dr. H. R. Storer.

August 19. A Brick, interesting in a historical point of view, having been taken from the ruins of a trading house, built by the Pilgrims near Sandwich, in the year 1627; by Amos Otis, Esq. Samples of the Soils of Michigan, Missouri, Indiana, Minnesota, Wisconsin, and Iowa; by Dr. S. Kneeland, Jr.

September 2. A brass instrument for making fine sections of wood and other articles; by Edward C. Cabot, Esq. A collection of one hundred and forty Bird Skins forwarded by the Government National Museum of Melbourne, to the Boston Society of Natural History, viz:—*Menura superba*, Lyre Bird; *Podiceps Australis*, Australian Grebe; *Cacatua Leadbeaterii*, Leadbeater's Cockatoo; *Ptilonorhynchus holosericeus*, Bower Bird; *Platycercus Barnars*, Barnars Parrakeet; *Grus Australasianus*, Australian Crane; *Cereopsis Novæ Hollandiæ*, Cereopsis Goose; *Pedronomus torquatus*, Plain Wanderer; *Hemipodius pyrrhothorax*, Chestnut-breasted Hemipode, three specimens; *Limosa melanuroides*, Godwit; *Entomophila picta*, Painted Honey-Eater; *Recurvirostris rubricollis*, Red-necked Avocet; *Psophodes crepitans*, Coach-whip Bird; *Platycercus Pennantii*, Pennant's Parrakeet; *Fulica Australis*, Australian Coot; *Phalacrocorax carboides*, Australian Cormorant; *Athene strenua*, Powerful Owl; *Casarca tadornoides*, Mountain Duck; *Porphyrio melanosus*, Black-backed Porphyrio; *Artamus superciliosus*, White eyebrowed Wood-Swallow, two specimens; *Gymnorhina organicum*, Tasmanian Crow-Shrike; *Anas punctata*, Chestnut-breasted Duck; *Nycticorax Caledonicus*, Nankeen Night-Heron; *Podiceps popicephalus*, Grey-hooded Grebe, two specimens; *Spheniscus minor*, Little Penguin; *Lobevanellus lobatus*, Spur-winged Plover; *Sterna melanauchen*, Black-naped Tern; *Cacatua Eos*, Rose-breasted Cockatoo; *Biziura lobata*, Musk Duck; *Cinclosoma punctatum*, Spotted Ground-Thrush; *Campephaga Jardinii*, Jardines Campephaga, two specimens; *Artamus personatus*, Masked Wood-Swallow; *Petroica Goodenovii*, Red-capped Robin; *Melithreptus melanocephalus*, Black-headed Honey Eater, two specimens; *Rhipidura rufifrons*, Rufous-fronted Fantail, two specimens; *Hemipodius velox*, Swift-flying Hemipode, two specimens: *Himantopus leucocephalus*, White-headed Stilt; *Estrelda temporalis*, Red-eyebrowed Finch, two specimens; *Amadina Lathamii*, Spotted-sided Finch, two specimens; *Hiaticula bicincta*, Double-banded Dottrel; *Anthochœra mellivora*, Brush Wattle-Bird, two specimens; *Climacteris picumnus*, White-throated Tree-Creeper, two specimens; *Acrocephalus Australis*, Reed Warbler; *Cysticola lineocapilla*, Black-striated Warbler, two specimens; *Pardalotus striatus*, Striated Pardalote, two specimens; *Zosterops dorsalis*, Grey-backed Zosterops, two specimens; *Dicæum hirundinaceum*, Swallow Dicæum, four specimens; *Glottis glottoides*, Green-Shank; *Sericornis humilis*, Sombre-colored Sericornis, two specimens; *Malurus cyaneus*, Blue Wren, two specimens; *Meliphaga Australasiana*, Tasmanian Honey-Eater; *Meliphaga mystacalis*, Moustached Honey-Eater, three specimens; *Collocalia arborea*, Tree Martin, two specimens; *Chrysoccrys lucidus*, Bronze-wing Cuckoo, two specimens; *Trichoglossus rubritorques*, Stringy-bark Parrakeet, two specimens; *Lathamus discolor*, Swift Parrakeet, three specimens; *Acanthiza chrysorrhœa*, Yellow-rumped Acanthiza; *Erythrodryas rhodinogaster*, Flame-breasted Robin, two specimens; *Acanthiza uropygialis*, Chestnut-rumped Acanthiza, two specimens; *Cincloramphus rufescens*, Rufous-tinted Cincloramphus, two specimens; *Acanthiza lineata*, Striated Acanthiza, four specimens; *Epthianura albifrons*, White-fronted Epthianura, two specimens; *Calamanthus fuliginosus*. Reed Lark, two specimens; *Falcunculus frontatus*, Tit Shrike; *Eopsaltria Australis*, Yellow-breasted Robin, two specimens; *Acanthorhynchus tenuirostris*, Slender-billed Spine-Bill, two specimens; *Pachycephala pectoralis*, Banded Thick-Head, two specimens; *Petroica multicolor*, Scarlet-breasted Robin, two specimens; *Sericornis osculans*, Allied Sericornis, two specimens; *Halcyon sanctus*, Sacred Kingfisher, two specimens; *Alcyone azurea*, Azure Kingfisher; *Rhipidura motacilloides*, Black Fan-tailed Flycatcher, two specimens; *Strepera anaphonensis*, Grey Crow-Shrike; *Corcorax leucopterus*, White-winged Chough, two specimens; *Campephaga Jardinii*, Jardine's Campephaga; *Schœniclus magnus*, Great Sandpiper, two specimens; *Philotis flava*, Yellow Honey-Eater, two specimens; *Myiagra plumbea*, Plumbeous Flycatcher, two specimens; *Anthus Australis*, Australian Pipit; *Sittela chrysoptera*, Orange-winged Sittela, two specimens; *Pachycephala*, ———; Four Specimens of Acanthiza, of two different species; *Smicornis brevirostris*, Short-billed Smicornis; Two Species of Honey Eater; *Cisticola magna*, Great Warbler; *Hiaticula ruficapilla*, Red-capped Dottrel; *Schœniclus albescens*, Little Sandpiper; *Schœniclus subarquatus*, Curlew Sandpiper.

The following birds, etc., obtained at Lake Superior in 1857, prepared and presented by Dr. S. Kneeland, Jr.; Male and female Sharp-shinned Hawk, *Accipiter fuscus*, Gmel.; Male Sparrow-Hawk, *Tinnunculus sparverius*, Linn.; Hawk Owl, *Surnia funerea*, Gmel.; Acadian Owl, male, *Athene Acadica*, Temm.; Male and female Kingfisher, *Ceryle alcyon*, Linn.; Pileated Woodpecker (young), *Dryocopus pileatus*, Linn.; Three-toed Woodpecker, male, *Picoides arcticus*, Rich & Sw.; Hairy Woodpecker, female, *Picus villosus*, Linn.; Male and female Downy Woodpecker, *Picus pubescens*, Linn.; Golden-winged Woodpecker, male, *Colaptes auratus*, Linn.; American Raven, *Corvus cacalotl*, Wagl.; Blue Jay, *Cyanocorax cristatus*, Linn.; Canada Jay, two females, *Perisoreus Canadensis*, Linn.; Rusty Grakle, male and female, *Scolecophagus ferrugineus*, Wils.; Pine Grosbeak, female, *Strobilophaga enucleator*, Linn.; Snow Bird, two specimens, *Plectrophanes nivalis*, Linn.; Snow Finch, *Fringilla hyemalis*, Linn.; Red-poll Linnet, two specimens, *Fringilla linaria*, Linn.; Cross-bill, *Loxia Americana*, Wils.; Purple Finch, *Carpodacus purpureus*, Gmel.; White-throated Sparrow, *Zonotrichia albicollis*, Gmel.; Fox-colored Sparrow, two females, *Zonotrichia iliaca*, Merr.; Olive Hermit Thrush, male and female, *Turdus solitarius?* Wils.; Brown Hermit Thrush, male and female, *Turdus fuscescens?* Shaw; Summer Duck, male, *Aix sponsa*, Linn.; Dusky Duck, female, *Anas obscura*, Gmel.; Common Snipe, female, *Gallinago Wilsonii*, Temm.; Red-breasted Snipe, female, *Macroramphus griseus*, Gmel.; Tell-tale Tatler, *Totanus melanoleucus*, Gmel.; Wilson's Plover, *Charadrius semipalmatus*, Kaup.; Solitary Tatler, *Totanus chloropygius*, Vieill; Sora Rail, *Ortygometra Carolina*, Linn.; Red Squirrel, *Sciurus*

Hudsonius, Gmel.; Striped Squirrel, *Tamias Lysteri*, Rich.—American Magpie, *Pica Hudsonica*, Sabine; Cedar Bird, *Ampelis cedrorum*, Vieill; prepared and presented by J. H. Slawson, of Houghton, Michigan.

September 16. Specimens of the common Water Lily, (*Nymphœa odorata*) of a pink color, from Yarmouth, Mass.; by Samuel Swan, Esq. Two Crania of Albatross; by Dr. S. Durkee.

BOOKS RECEIVED DURING THE QUARTER ENDING SEPT. 30, 1857.

Memoirs of the Geological Society of India. Vol. I. Part I. 8vo. Calcutta, 1856. *From the Governor-General of India.*

Prodromus descriptionis Animalium Evertebratorum quæ observavit et descripsit W. Stimpson. Part 2d. 8vo. Pamph. Philadelphia, 1857. *From the Author.*

Notice sur une nouvelle Espèce de Davidsonia. Par L. De Koninck. *From Prof. H. D. Rogers.*

Tableaux of New Orleans. By B. Dowler, M. D. 8vo. Pamph. *From the Author.*

Lettres sur les Roches du Jura. Par Jules Marcou. 8vo. Première Livraison. 8vo. Paris, 1857. *From the Author.*

Smithsonian Contributions to Knowledge. Vol. IX. 4to. Washington, D. C. 1857.

Annual Reports of the Board of Regents of the Smithsonian Institution. 8vo. 2 vols. 1855–6. Washington, D. C. *From the Smithsonian Institution.*

Journal de l'Instruction Publique. Vol. I. Nos. 5–8. 8vo. Pamph. Montreal, 1857.

Journal of Education. Vol. I. No. 4. 4to. Montreal, 1857.

Farmer's Journal. Vol. V. No. 1. 8vo. Pamph. Montreal, 1857. *From L. A. H. Latour.*

First Annual Report of the Secretary of the Board of Agriculture of Massachusetts. 2d Series. 8vo. Boston, 1853.

Transactions of the Michigan State Agricultural Society. Vol. VII. 8vo. Lansing, 1856.

Tenth and Eleventh Annual Reports of the Board of Agriculture of Ohio, for 1855–6. 2 vols. 8vo. Chillicothe, 1856–7.

Twentieth Annual Report of the Board of Education. Pamph. 8vo. Boston. 1857.

Abstract of the Census of Massachusetts for 1857.

Annual Reports relating to Births, Marriages, Deaths, &c., in Massachusetts, for 1855. 8vo. Pamph. Boston.

Transactions of the Massachusetts Society for the Promotion of Agriculture for 1856. 8vo. Pamph. Boston, 1857.

Synopsis of Communications on the Cause and Cure of the Potato Rot. 8vo. Pamph. Boston, 1852. *From C. L. Flint, Secretary of the Board of Agriculture.*

History of Wisconsin. Vols. I. and III. By Wm. R. Smith. 8vo. Madison, 1854.

Address before the Regents of the University. By D. Read, L.L. D. 8vo. Pamph. Madison, 1856.

Charter of the City of Wisconsin. 8vo. Pamph. Madison, 1856.

First Annual Report of the Executive Committee of the State Historical Society of Wisconsin. 8vo. Pamph. Madison, 1855.

Report of the Iron of Dodge and Washington Counties, Wisconsin. By J. G. Percival. 8vo. Pamph. Milwaukee, 1855.

Annual Report of the Geological Survey of Wisconsin. By J. G. Percival. 8vo. Pamph. Madison, 1856.

State Annual Report and Collections of the State Historical Society of Wisconsin for 1855. 8vo. Vol. II. Madison, 1856. *From the Historical Society of Wisconsin.*

Bulletin de la Société de Geographie. 4iéme Serie. Tome XIII. 8vo. Paris. 1857.

Canadian Naturalist and Geologist. Vol. II. No. 3, July. No. 4, September, 1857. Montreal.

Second Meteorological Report presented to Parliament. Long 4to. Pamph. Melbourne, 1856–7.

Account of the Smithsonian Institution. By W. J. Rhees. 8vo. Pamph. Washington, 1857.

Monatsbericht der Königlichen Preuss. Akademie der Wissenschaften zu Berlin. January to December, 1856. 11 Nos. 8vo.

Mathematische Abhandlungen der Königlichen Akademie der Wissenschaften zu Berlin. 4to. 1855. Aus dem Jahre Physikalische Abhandlungen der K. Akademie der Wissenschaften zu Berlin. 4to.

Bivalve Shells of the British Islands. By Wm. Turton. 4to. London. 1848.

Index Testaceologicus. 8vo. London, 1818. By W. Wood.

Genera of Recent Mollusca. Parts 27–30. 8vo. London. By H. and A. Adams.

Catalogue of North American Mammals, chiefly in the Museum of the Smithsonian Institution. By S. F. Baird. 4to. Pamph. 1857.

Silliman's American Journal of Science and Art. July, September, 1857.

New York Journal of Medicine. July, 1857.

Proceedings of the Zoölogical Society of London. Part 23. 8vo. 1855.

Proceedings of the Elliott Society. pp. 49–100. 8vo. 1857. *Received in Exchange.*

Quarterly Journal of the Zoölogical Society. Vol. XIII. Part 3. 8vo. London, 1857.

Annals and Magazine of Natural History. July, August, September, 1857. 8vo. London. *From the Courtis Fund.*

Historical Sketches of Eminent Statesmen. Brougham, Henry, Lord. 2 vols. 8vo. Philadelphia, 1854.

Encyclopædia Britannica. Vol. XIII. 4to. Boston, 1857. *Deposited by the Republican Institution.*

October 7, 1857.

The President in the Chair.

Mr. Theodore Lyman read a paper upon a new genus and species of Coral, *Syndepas Gouldii.*

GENUS SYNDEPAS, (Lyman.)

Derivation, *σὺν*, *δέπας*, (goblet.)

Growing in tufts (or single?); calicles cylindrical or turbinate; striated on the outside with granulated ridges; within deep; walls solid; larger lamellæ exsert, finely toothed on their edges; budding from the side, low down, or from the cœnenchyma between the calicles.

This genus is distinguished from Desmophyllum of Ehrenberg by the fact that the lamellæ are toothed and not arranged in bundles; from Culicia of Dana, by depth of calicle, external striæ and exsert lamellæ; from Cladocera of Ehrenberg by different mode of growth and by internal dissepiments; and from Dendrophyllia of Blainville, by different mode of growth and the solidity of the walls. The *Caryophyllia solitaria* (Lesueur) and the *Caryophylliæ dilatata* and *pocillum* of Dana will probably come under the genus.

SYNDEPAS GOULDII, (Lyman.)

The general appearance is that of a cluster of little goblets connected by a lime cement, which is often the resting-place of Serpulæ, Bryozoa, and boring shells. The zoöphyte buds, either from the side, low down, or from the open space between the calicles, (*cœnenchyma*, Edwards.) The group begins with three or four cups, low, standing well apart, and connected at their bases by a thin sheet of cœnenchyma. New buds appear, and the whole growing upwards and outwards gradually makes a tuft of crowded though independent individuals. The calicles, though sometimes cylindrical, are normally turbinate; within, they have a depth often as great as 3½ lines. Their height varies from 3½ to 9½ lines. The tallest are the oldest, and have continued growing with their younger neighbors. The greater diameter is from 4 to 6 lines, and the difference between the longitudinal and transverse diameters is occasionally as great as 6 to 3½; at other times the calicles are nearly round. In the longitudinal axis there usually lie two lamellæ of the first cycle, which shows a tendency to a bilateral symmetry. The larger calicles have from 48 to 74 lamellæ, so that there are four cycles, and sometimes part of a fifth. Those of the last cycle, however, are very small and thin, and can scarcely be seen without a lens. The six that make the first cycle are conspicuous for their size; they are rounded at their upper ends, exsert, often as much as a line, and are thicker than the wall of the calicle. Their sides are covered with grains, arranged more or less regularly in curved lines, running from the wall to the edge of the lamella. Wherever one of these lines ends on the margin, it projects a little, and thus the edge of the lamella is toothed. The lamellæ of the second and third cycles do not materially differ, except in size, from those of the first. The lamellæ are not confined within the limits of the wall of the calicle, but appear on its outside, as vertical ridges or striæ, extending often from top to bottom; in some instances, however, they are nearly covered by marine incrustation to within a line of the top; and, again, they may be obliterated by the growth outwards of the wall. These ridges, which may properly be called the outer edges of the lamellæ, are thicker than the inner edges, but present, to a greater or less degree, the same granular teeth. The smallest lamellæ occasionally bend sidewise and join their neighbors, a feature observed in its perfection among the Eupsammidæ, and, to some extent, in other families. The columella is frequently wanting, or represented only by one or two lamellar teeth; but, on the other hand, it may form, at the bottom of the calicle, a spongy mass, two or three lines in diameter. The wall, at its upper margin, is very thin and diaphanous; outside, in the spaces between the lamellæ, it is slightly granulated. It is highly probable that the polyp, like the *Caryophyllia solitaria*, has the protruded, Caryophyllian mouth, and about twenty-two short tentacles, in two rows; and farther, that it has the power of raising itself above the edge of the calicle. It is evidently as successful a collector of crustacea as its numerous kindred; for, still wedged in the visceral cavity of one individual, was found part of a small crab.

The specimens were got by Mr. J. P. Couthouy, from the wreck of the San Pedro, sunk, in 1814, in the bay of Cumana, on the northeast coast of South America, and were presented by him to Dr. A. A. Gould. Dr. Gould, after whom I have named the species, kindly put them all at my disposal to be described.

Prof. Dana briefly notices three species of Caryophyllia, of which he says: "The following species have been observed only in the simple state, and may or may not be budding species." Dana, Zoöph. p. 383. The first of these, *C. solitaria*, has been described by Lesueur, (Journal Acad. Nat. Scien. Philad. vol. 1, p. 179,) and is also spoken of by Lamarck. It comes very near to the present species, but differs as follows: it has fifteen to sixteen larger lamellæ, alternating with smaller, while this species has, at the most, ten or twelve that can in any way be called larger. *C. solitaria* has the margin of the calicle nearly entire, while *S. Gouldii* has it rough with heads of lamella. Lesueur's figure represents the corallum partially buried in, or surrounded by, the substance to which it is attached, a mode of life quite different from the encrusting habit of the present coral. The second species, *C. pocillum* (Dana), is much broader than high, a proportion not met with in over 150 calicles, young and old, of *S. Gouldii* which I have examined; and in which it is rare to find the breadth as great as the height. The species now under consideration has only six lamellæ decidedly prominent; while the other has "twelve larger, very broad and exsert," and "three intermediate, smaller and one half narrower; an arrangement not found at all in the subject of this paper. The third, *C. dilatata* (Dana), differs so strongly that no comparison is required. All three of these have the outward striæ stretching only part way down the wall, while, in almost all the specimens of *S. Gouldii* the striæ reach quite to the bottom of the calicle. The most important distinction of all, however, is, that *C. solitaria*, *pocillum*, and *dilatata*, have only been seen solitary, while this species has invariably a *grouping habit;* nor do I think a calicle could be broken off in such a way as to give the idea that it had grown single. Prof. Dana has been at the trouble of examining a specimen I sent him, and has written me, that in his opinion the polyp is new.

This species would come under the family of Caryophyllidæ of Dana, though his description certainly seems inexact, or at least ambiguous, when he says; "coralla within not transversely septate, surface not lamello-striate;" for some of the genus Caryophyllia (e. g. *Caryophyllia arbuscula*) have dissepiments, and the exterior of some species is striate, (e. g. *C. pocillum*, &c.) This family is represented in the classification of Edwards and Haime by parts of the families, Eupsammidæ, Turbinolidæ, Astreidæ, Oculinidæ, and Cyathophyllidæ. The present genus has all the characters of the Turbinolidæ, but cannot be put with them, on account of the toothed lamellæ; whereas Edwards expressly says: "The lamellar lines never separate at their extremities, either singly or in bundles, to form crenellations, teeth, spines, or lobes, and the free edge of the lamella remains always entire." This only shows how unphilosophical are the family characters given by some of the most eminent authorities. It must be pretty plain that this genus should make one of the natural group that includes Turbinolia, Desmophyllum, Flabellum, Cyathina, &c., yet it cannot be admitted there, according to Edwards, because the grains on the sides of the lamellæ are continued so as to project a little beyond the edge.

This genus would fall under Dana's tribe of Caryophyllacea, which is characterized by "numerous tentacles in two or more series," inferior gemmation, when any, and many-rayed cells, and corresponds to parts of Edwards's Sections, *Zoantharia aporosa*, *perforata*, *rugosa*, *malacodermata*, and *tabulata*. This Tribe and these Sections would be called, by some systematic writers, Suborders. These great discrepances between distinguished authors, and that, too, on the threshold of classification, may perhaps be accounted for by the fact that the classification of Dana is founded on the polyps themselves and their skeleton, while that of Edwards and Haime rests principally on the ultimate structure of the skeleton or *polypier*. A single instance will put this difference in a clear light. Edwards puts Madrepores, Porites, and Dendrophylliæ in the same Sub-order, (*Zoantharia perforata*,) because they all have holes through their walls; but then the Dendrophylliæ have numerous tentacles, in two rows, and a protruding mouth, while Porites and Madrepores have a mouth on a level with the edge of the calicle, and only twelve tentacles. Dana therefore puts under Caryophyllacea the Dendrophylliæ, and under Madreporacea the Madrepores and Porites.

Dr. A. A. Hayes read a letter from Dr. C. F. Winslow, of Troy, N. Y., and presented, in his name, a supposed fragment of a human cranium, found in California, 180 feet below the surface of Table Mountain. The thanks of the Society were voted for the gift.

Dr. Winslow writes: "I sent by a friend, who was going to Boston this morning, a precious relic of the human race of earlier times, found recently in California, 180 feet below the surface of Table Mountain. As it is the first organic sign of human existence preceding or coeval with a drift age, or a general or minor 'deluge,' that has been found in the earth, I have thought it would be interesting for the scientific gentlemen of Boston to discuss the subject, and for a portion of the fragment sent to me to be preserved in the cabinet of your Society of Natural History. My friend Col. Hubbs, whose gold-claims in the mountains seem to have given him much knowledge of this singular locality, writes that the fragment was brought up in 'pay dirt' (the miners' name for the placer gold drift) of the Columbia claim, and that the various strata passed through in sinking the shaft consist of volcanic formations entirely. Whether his knowledge is accurate touching the volcanic formations I have some doubt, and have written for more certain information.

"The mastodon's bones being found in the same deposits, points very clearly to the probability of the appearance of the human race, on the western portions of North America at least, before the extinction of those huge creatures. As I have fragments of Mastodon and *Elephas primigenius*, or a kindred species, taken between ten and twenty feet below the surface, among the upper placer gold deposits of the same vicinity, it would seem that man was probably contemporary, for a certain period, with the closing dynasties of these two formidable races of quadrupeds. This discovery of human and mastodon remains in the same locality gives also great strength to the possible truth of the old

Indian tradition of the contemporary existence of the mammoth and aboriginals of this region of the globe."

Dr. A. A. Hayes also read a letter from Mr. A. P. Davis, of Buchanan, Liberia, giving some farther particulars in relation to the discovery of Native Iron in Africa.

Mr. Davis, from whom the specimen analyzed by Dr. Hayes was received, in the present letter describes the mass found as "being as large as the crown of a man's hat, and like a rock, of a yellow color taken from the earth. From its appearance I supposed it would break into pieces; but it resisted the repeated blows of a sledge-hammer of fifteen pounds weight; and I could not separate it by breaking, as the hardest blows only flattened it. It was by these means we found out it was malleable. The huge bulk was put in the fire and blown to, until it became sufficiently hot to be cut. It was divided into many parts, and some of the same bulk was actually ore, not malleable at all. It had a very craggy appearance, with many cells in it. Where the ore is to be had, or the distance that the ore in question came from, is about four to six days' travel. I have none now, but will, with Divine help, get some as soon as possible."

Dr. Hayes added that he was indebted to the efforts and kindness of Rev. Joseph Tracy, of the Colonization Society, for the letter from Mr. Davis, and other interesting facts in relation to the natural productions of the country bordering on the lands of the colony of Liberia.

The President exhibited specimens of curiously intertwining and intergrowing woods from Surinam; they were referred to the Curator of Botany.

The Curator of Crustacea exhibited the Crustacea collected in California by Mr. E. Samuels, together with other specimens presented by the Smithsonian Institution. Among them are several new species described by Mr. Stimpson in the forthcoming number of the Society's Journal.

The Curator of Ichthyology presented a Fish from the North Atlantic, a new species, and probably belonging to a genus new to North America.

Dr. S. Kneeland presented about fifty specimens of Mammalia, Birds, and Reptiles from Lake Superior.

Dr Kneeland remarked that, as yet, there were no rats and common mice at Portage Lake, the place of these animals being filled by the Flying Squirrels which breed in the walls of the houses, and by the Field Mice.

The reptile, described by him at a former meeting (Proceedings, Vol. VI. p. 152) as a *Siredon*, is a *Menobranchus*, but probably a new species, as it does not answer to the descriptions of either *M. maculatus* or *M. lateralis*. If it is new, the specific name of *M. hyemalis* would hold good. The salamanders, trout, and tortoises vary somewhat from described species.

Mr. F. H. Storer exhibited some proof-sheets of a work upon the Plants of Austria, by Ettingshausen and Pokorny, recently published at the Imperial Printing-Office in Vienna. The impressions, from which these prints were struck off, are obtained by the process known as "Nature's own Engraving," in which the dried plant to be copied is placed between a sheet of steel and another of very pure soft lead, and all together subjected to great pressure by passage between rollers. An impression of the plant, even in microscopic details of the most delicate Algæ, is thus transferred to the soft lead—the plant being forced into it,—from which any number of copies may be taken by electrotyping.

Examples of the application of this process in the delineation of other objects, such as small animals, agates, fossil impressions, sections of wood, lace, &c., were also exhibited.

Dr. D. H. Storer stated that he had lately received a fine specimen of the Sting Ray from Dr. E. W. Carpenter, of Chatham. It proves to be the *Pastinaca hastata* of Dekay. It measured nine feet from the snout to the extremity of the tail. It is described by Dekay as having three caudal spines; this specimen, however, presented but one, and the stump of a second, anterior to it.

DEPARTMENT OF MICROSCOPY.

The Secretary, Dr. B. S. Shaw, exhibited specimens of the larva of some species of Fly (*Musca* or *Œstrus*), which were found in the skin of the scalp, face, neck, and back of a child seven days old.

The specimens were imbedded in pustules of about one eighth of an inch in diameter, resting upon an inflamed base half an inch or more in width. The only specimen preserved for examination was placed in alcohol. After it had been immersed in this fluid for several days, it was found to measure a quarter of an inch in length by a sixteenth in breadth. Color white. Body composed of eleven segments, exclusive of head; anterior portion of each segment surrounded by a band of bristles or spines. Head armed with two black hooklets; no visible mouth.

Cuvier speaks of the mouth of the cutaneous larvæ as "being composed of fleshy lobes only, whilst that of the internal larvæ is armed with two strong bent hooks." If this is true, the natural nidus of these larvæ would seem to be the internal organs rather than the skin. Humboldt, Rudolphi, Linnæus, Gmelin, and others, speak of a species of Œstrus as *Œstrus hominis*. This species, however, so far as is known, has only been met with in South America, and when thoroughly studied may prove to be identical with one of those better known. In endeavoring to ascertain what is known concerning the presence of maggots in the human body, the Secretary had met with a large number of cases where the mucous membranes had been infested with them, and with several cases where the skin had been chosen as the nidus for the larva or egg. Of the Coleopterous insects, such as beetles, mealworms, &c., he had collected between thirty and forty cases, where their larvæ had been found in the stomach, intestines, urinary organs, nostrils, and inner canthus of eye. The larvæ of Neuroptera and Lepidoptera have been found in similar situations. Of the larvæ of Diptera, those of Musca and Œstrus seem to be most common; those of Musca forming by far the largest number of any one genus, thirty-seven cases having been tabulated and reported by Mr. F. W. Hope, in the Transactions of the Entomological Society of London, Vol. II. The species of these maggots was generally unknown; but many were recognized as belonging to *M. vomitoria*, *M. carnaria*, and *M. domestica*.

The genus Œstrus seems to be that which most frequently deposits upon the external surface of the human body. Of these cases he had met with two upon the scrotum, two in the skin of the abdomen, two in the scalp, and one in each of the following named situations,—leg, arm, scapula, ear, jaws, antrum, and stomach. These larvæ were either called *Œstrus hominis*, or they were described without a specific name, with the exception of one, which was *Œstrus bovis*.

A full account of this case was read before the Boston Society for Medical Improvement, and published in the Boston Medical and Surgical Journal of October 8, 1857.

Mr. C. J. Sprague exhibited specimens of a new fungus, *Glœosporium crocosporum*, Berk. and Curt, named from specimens collected by himself.

This fungus is found very commonly in autumn upon various kinds of melon. It appears in orange spots upon the outer surface, and is generally found in places which seem to have received a blow. Sometimes, however, the fungus covers the whole fruit in a yellow and orange incrustation. It belongs to that numerous family of fungi which infest the leaves and bark of all plants, and the epidermis of fruits. There is no true perithecium, but the spores spring in myriads from a nucleus just beneath the epidermis, and then ooze forth through an aperture in irregular granular masses drying on the surface. They are elongated oval in shape, and of a clear yellow-orange color in mass.

Mr. Sprague also exhibited the spores under a microscope.

October 21, 1857.

The President in the Chair.

In the absence of the Recording Secretary, Mr. C. J. Sprague was chosen Secretary *pro tem.*

Dr. A. A. Gould read a letter from Prof. Hubbard of Dartmouth College, giving an account of a fish which was seen to fall to the earth, during a sudden squall of wind and rain, in a town in Vermont. Dr. Gould thought the fact interesting, as corroborating several instances of the same kind which had previously been recorded, some of which had come to his own knowledge.

Dr. Gould also stated that a letter had been sent to him through Prof. Lovering by Mr. George S. Blackie, written by Prof. Gregory of Edinburgh to the late Prof. Bailey. Dr. Gould read several passages of general interest regarding certain observations made by Prof. Gregory on the Diatomaceous Exuviæ of the Post-Tertiary sand at Glenshira, near Inverary, the greater part of the letter being devoted to a close criticism on certain new forms. Several prepared specimens, and a number of pamphlets on the subject, were laid on the table, to be added to the collection of Prof. Bailey.

On motion of Dr. Gould, it was voted that the receipt of the letter and specimens be acknowledged with thanks to Prof. Gregory.

Dr. Kneeland presented a large number of specimens, collected by himself, illustrating the different forms in which the copper occurs, and the various rocks with which it is associated, in the Lake Superior district of Keweenaw Point.

All the copper, with the exception of a small amount of carbonate near the surface, which he had seen over this extensive district, was the pure metal;—he showed its different forms of mass, leaf, and botryoidal copper; of rounded pieces, varying from a rifle ball to a small shot in size, scattered through the rock, called *shot copper;* and also the metal in a crystalline form, in curiously contorted spiculæ, and in the thinnest laminæ. Associated with the metal were the various forms of granular and amygdaloidal trap, tabular spar, quartz, epidote, prehnite, calc-spar, &c.; crystals of dog-tooth spar, of calc-spar containing copper, of quartz, &c. Some of the specimens were blackened by the kiln-fires employed to facilitate the separation of the matrix. The specimens were from the Minnesota, Cliff, and Portage Lake districts. He also presented several specimens of native *silver* associated with copper; of agates from the lake shore; of chlorastrolites, found only on Isle Royale island; of sulphuret of copper and rose quartz from the north shore of the lake; and of fossil corals from the drift. He thought the specimens of value, not only mineralogically, but especially as illustrating this particular and almost unique copper deposit; for such a series he had looked in vain when wishing to study this subject, and he thought the present collection, with others he made last winter from the same localities, would be of great value to any one pursuing this study at so great a distance from the copper region.

Dr. Bacon exhibited a calculus taken from the urethra of an ox. It consisted essentially of silica, with a little carbonate and phosphate of lime. It measured about four lines in diameter, and presented a rough or tuberculated surface.

Dr. Wyman asked how common calculi of this chemical composition are.

Dr. Bacon said that very few cases are on record, but that probably many passed unnoticed.

Dr. Gould asked whether the lime-salts were diffused throughout the mass or not.

Dr. Bacon said that in this case they are uniformly diffused. The silica was amorphous, not crystalline.

Dr. Kneeland, who brought the specimen from the neighborhood of Lake Superior, said that the animal died from this obstruction. The calculus was perfectly impacted in the urethra, so as to prevent the egress of the bloody urine which distended the bladder.*

Mr. John Green made some remarks upon the microscopic structure of certain fish scales he had recently been examining; he showed them to be of bony structure, which he considered to have an important bearing on classification.

Dr. Gould alluded to some recent observations in France in relation to the reproduction of Arachnides, or rather their power of producing fertile eggs, though completely isolated from the male. Blanchard found that the genital apparatus of the female was composed of two ample tubes to which the ovarian crypts were attached. These serve as reservoirs in which the seminal fluid accumulates, through which the eggs pass and are impregnated; but which is not exhausted by one ovulation, serving for many subsequent occasions. Blanchard therefore concludes that one coupling is necessary, and serves for several years. M. Delfrayssé had in like manner invoked anatomy to settle the question. He likewise finds the two tubes and the fecundating liquid; but states that he has found two little glandular bodies between the ovaries and tubes, which secrete the fertilizing fluid. He therefore concludes that the animals are *hermaphrodite*;—that the seminal fluid is furnished at the time of laying eggs, and not kept in store; and that no copulation is absolutely necessary. Dr. G. remarked that there was evidently room for further anatomical research, and did not see how the latter conclusion comported with the well-known organization of the Arachnides as males and females.

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* In the account of Calculi from the bladder of an ox, upon page 213 of this volume, it should have been stated that their composition was nearly pure silica. SECRETARY.

Mr. Sprague laid on the table a package of Algæ, presented to the Society by Mr. B. D. Greene. They formed part of Prof. Harvey's collections, and came from Australia, Ceylon, and the Friendly Islands. They were beautifully prepared with printed labels, and furnished another instance of Mr. Greene's liberality to the Society.

The Corresponding Secretary was instructed to make a fitting acknowledgment to Mr. Greene for the donation.

The President made some remarks on the mode of reproduction of certain fishes in Surinam, and detailed some interesting points of structure in their eyes.

Mr. Joseph Tillinghast and Mr. George H. Rogers, of Gloucester, were elected Resident Members.

November 4, 1857.

Dr. C. T. Jackson, Vice-President, in the Chair.

Dr. Jackson exhibited crystals of sugar produced by the *Sorghum saccharatum*, or Chinese Sugar Cane. They were six-sided prisms, and rhombic prisms with angles of 103° and 77°—crystallographic proof, as he considered, of their being *cane sugar*.

Dr. Jackson stated that the young plant contains gum or dextrine, and glucose. As the period of inflorescence is approached, large quantities of starch globules may be seen in the cells of the plant. If, at this period, the stalk is pressed, the fluid which exudes is found slightly milky, owing to the presence of starch globules, which subside after some time. When the seed ripens, the starch diminishes in quantity in the cane, and the expressed juice gives, upon evaporation, almost wholly *cane sugar*. This is a point of interest in the manufacture of sugar. The presence of starch in the syrup prevents the ready formation of crystals of cane sugar, and it should therefore be removed by decantation or filtration. Fermentation of the syrup and the conversion of the sugar into lactic acid and mannite takes place in warm weather. It should therefore be boiled before viscous fermentation takes place. Dr. Jackson expressed the opinion that the Sorghum would ripen in the Northern States in warm seasons, if planted early.

Mr. Theodore Lyman read a paper upon a new species of Coral, as follows:—

The genus Oculina, established in 1816 by Lamarck, includes the polyps distinguished by the solidity of their corallum throughout; to this feature may be added, that they have generally a tendency to branching, and an abundance of solid tissue between the calicles. The animals themselves, so far as observed, have a well-marked central disk, and about twenty-four slender, tapering tentacles, alternating longer and shorter. Prof. Dana (1848) describes nine species under the genus Oculina, and six species under the genus Allopora, which was included by Lamarck's genus Oculina, and which includes Allopora (Ehrenberg, 1834) and Stylaster (Gray, 1831). Milne Edwards and Haime (Monographie des Oculinides, Annales des Scien. Nat. 3ème Série, tome xiii. 1850,) have established a family of Oculinidæ, which includes, besides new species, all species under the above-named genera. This family has twenty genera, principally characterized by the modes of budding, the variations of the columella and paluli, the smoothness or roughness of the surface, and the shapes of the lamellæ. Of these genera, several are fossil, and others have only new species. The species, according to Dana, are changed as follows, by Edwards, *O. diffusa*, *varicosa*, and *pallens* appear under the name *diffusa; O. oculata* and *virginea* become *oculata*. *O. horrescens* is transferred to the genus Acrhelia; *O. prolifera* to Lophelia; *O. axillaris* to Cyathelia; and *O. hirtella* to Schlerhelia. And, finally, the *Caryophyllia anthophyllum* of Dana is brought into this family and put in the genus Lophelia. It should be observed that these genera of Edwards and Haime are, as usual in their classification, founded entirely on the structure of the polyp frame, without reference to the soft parts.

OCULINA GLOMERATA, Lyman.

Mass, encrusting a piece of sheet lead. In two or three places there are signs of the beginnings of branchlets. Corallum solid, granulated slightly in the spaces between the calicles. Calicles in some places crowded, and with numerous buds among them; generally $1\frac{1}{4}$ lines broad, and often $\frac{3}{4}$ line high; round, upright, striated and granulated outside; a few much larger than the rest. Lamellæ, in the full-grown calicles, 26, rarely less, and in a few instances as many as 38; a little exsert, rather delicate, every other one reaching the centre; all toothed for their whole length, and the larger ones with two or three little lobes, the lower of which might be considered as paluli; sides finely toothed. Columella small generally, and inclined to be spongy.

The specimen is a couple of inches long and an inch high. It was brought by Mr. Couthouy from the wreck of the San Pedro, sunk in 1814 in the bay of Cumana; and is now in the collection of Dr. A. A. Gould. This species would come under the genus Oculina as defined by Edwards. The other species differ from it as follows: *O. virginea*, Indian Ocean; calicles far apart; rarely more than 24 lamellæ—calicles a little swelled at the base. *O. speciosa* differs like the preceding, and has moreover two circles of *distinct* paluli. *O. Petiveri*, calicles distant, strongly swelled at the base, and with furrows between. *O. Banksii*, calicles distant, hardly raised above the surface, surrounded by a depression. *O. Valenciennesi*, calicles little prominent, sometimes even depressed. *O. fissipara*, fissiparous; lamellæ irregular. *O. varicosa*, calicles farther apart; lamellæ stouter, less toothed; cavity deeper; only 24 lamellæ. *O. diffusa*, calicles farther apart; lamellæ stouter, little, or not at all, exsert, 24 in number. *O. pallens*, calicles larger, deeper; lamellæ much stouter, and less toothed. There is but one Oculina known which is encrusting in its growth. This is the *O. conferta*, (British Fossil Corals, p. 27, tab. 11, fig. 2, 1850,) which is an eocene fossil, and may, perhaps, with the present species, be only the young state of an arborescent form.

Dr. Jackson read a communication from John Bachelder, Esq., dated Monument, October 27, 1857, upon the

Ruins of a Trading House erected by the Pilgrims at that place. The communication was presented, upon motion of Dr. Jackson, to the Massachusetts Historical Society.

Prof. Theophilus Parsons presented a section of an Elm, which exhibited a singular involuted growth appearing after the falling of a large limb.

The growth occurred at the edge of a hollow in the trunk, and presented the appearance of a curling inward of the edge of the cavity,—by which it was several times rolled upon itself, the bark following the curl to its termination. Prof. Parsons, in reply to a question from the Corresponding Secretary, stated that this curl, if unrolled, would more than span the gap on the edge of which it was found.

Mr. Sprague thought that the curvature of the tree admitted of simple explanation. The falling of the large bough had carried with it a considerable portion of the heart wood of the tree, leaving the centre exposed to decay. As, year after year, this central portion disappeared, the outer, living shell became thinner and thinner, and began to assume a convolute form, from the growth being always on one surface only. The shrinking and drying of the internal part, joined to the swelling and increasing of the external part, had gradually curved the rim of wood, like the convolute estivation of some corollas. As the tree grew in height, the aperture left by the fallen bough, and increased by the subsequent decay, gradually became narrower by the shrinkage and inward growth of the margins.

Prof. Parsons concurred with Mr. Sprague in this explanation.

The Corresponding Secretary read the following letters, viz: From the Academy of Natural Sciences, Philadelphia, April 7; the Academy of Science of St. Louis, June 6, and September 11; the American Philosophical Society, Sept. 10; the Académie Royale, &c. de Belgique, Bruxelles, January 15, 1856, and February 6, 1857; K. Akademie der Wissenschaften, Wien, April 10, 1857; Royal Society of Sciences at Göttingen, April 18, 1857; Smithsonian Institution, June, 1857, acknowledging the receipt of the Proceedings of the Society; Verein für Naturkunde in Nassau, March 1, 1857; Cambridge Philosophical Society, February 26, 1857; K. Akademie der Wissenschaften, Wien, November 24, 1856, presenting their various publications. From Prof. Joseph Lovering, July 20, presenting, in behalf of the American Association for the Advancement of Science, its Proceedings; Academy of Natural Sciences, June 19, asking for a missing number of the Journal; the Georgic Association, Randolph, N. Y., July 21, asking for the publications of the Society; Geological Museum, Calcutta, January, 1857, making the same request, and sending its own Memoirs; and from James H. Slawson, Houghton, Michigan, acknowledging his election as Corresponding Member.

DEPARTMENT OF MICROSCOPY.

Mr. John Green exhibited a large number of thin sections of the Bush Ropes, so called,—peculiar woods obtained by him in Surinam, and made some extended remarks upon their method of growth. He said he was preparing a paper upon the subject, which he should read when his examinations are completed.

Dr. James C. White exhibited the Eggs of the Itch Insect, *Sarcoptes hominis*.

He remarked that, as is now well known, it is the female only which burrows. She bores transversely downwards through the skin, but never to a great depth beneath the surface. Each day as she moves onward she leaves an egg behind her. After she has deposited fourteen, the larva of the first matures and creeps out upon the surface, there to ramble with the other young and males till maturity, when if a female, and after copulation with a male, also an outsider, it repeats the process above mentioned. Each day a young one emerges from the burrow, leaving behind the membranous walls of its cell. The acarus may thus extend its hole indefinitely, even to the extent of four inches, and its course may be traced by a white elevated line on the skin. It never leaves its burrow ; but if a pustule should be formed above it, by the scratching of the patient, the larvæ are destroyed ; but the mother cunningly emerges to the surface at the edge of the pustule, and commences a downward descent anew. The male is much smaller than the female, and has ten extremities. The female wants one of these posteriorly, and the young three. She is also armed with two saw-like claws, which cut a way through the tissues by a transverse motion over each other as the blades of scissors do. Hebra thinks the opening for the exit of the eggs is a fold or valve on the belly, which may be easily seen, though it has never been figured.

The present specimen was snipped from the glans penis, a favorite and undisturbed lurking-place. It consists of a canal bored obliquely through the tissues, containing a series of twelve eggs, together with fœcal matter, strewn along the passage. When first cut out, the animal herself was seen at the lower extremity with one egg in her body. The first two or three eggs were quite mature, so that the extremities of the young could be distinctly made out. She generates but one egg a day, though Bourgignon says he has seen four at once in her body. Hebra thinks this impossible, and he is probably correct, as he has made them an especial study, cultivating a colony on himself for two or three months. He once saw the two sexes in act of coition, belly to belly. The same species occurs on the lion, camel, and other animals.

Dr. White showed also the spores of the parasitic plant of *Pityriasis versicolor.*

The specimen was taken two or three days since from the back of a gentleman who was not aware of any cutaneous disease. There were some dozen patches, the largest the size of a pea. They present a yellow appearance, are elevated, and consist of epidermal cells, between the layers of which the parasite is found. Some alkaline carbonate is added to make the epithelium transparent. It is still a mooted point whether the parasite is the cause of the disease, or merely a growth in an exudative process. The fact that we sometimes fail to find the parasite tends to the latter conclusion. Microscopically, it consists of spores, containing a fat-like nucleus, grouped together between the layers of the epithelial cells. Sometimes the cells, by union, form long branching tubes, with here and there a nucleus scattered along their course. The cells sometimes subdivide also. It does not appear to be very rare here, as Dr. White had seen three cases in as many weeks.

Mr. C. J. Sprague exhibited five specimens of *Artotrogus Asterophora*, Fr., parasitic upon Nyctalis, and showed the copious echinulate spores under the microscope. He also exhibited specimens of a nearly allied fungus, *Sepedonium cervinum*, Fr., which is rare, and which in this case grew upon a matrix where it had not before been detected.

This fungus has generally been associated with *Peziza macropus*, and was imperfectly figured by Ditmar upon this plant in Sturm's Fl. Deutsch, where the species was first described under the name of *Mycogone cervinum.* The specimens exhibited were found by Mr. Denis Murray upon *Helvella ephippium* Lév. The lower portion of the hymenial surface was clothed with a white, felty envelope, while the upper portion was brown with the copious spores of the ripened parasite. The spores were exhibited under the microscope in different stages of growth and maturity. Mingled with them were many spores of an entirely different character. They were linear, narrowed at each end, uniseptate, pellucid, nearly colorless, with a yellowish tinge. Mr. Sprague had detected their growth from the ends of long, slender filaments, much smaller than those of the Sepidonium. Bonorden mentions that other parasites are frequently found in company with the Sepedonium, such as Monosphorium and Sporotrichum; but neither of these genera bear spores like those in question.

Prof. Parsons, of Cambridge, exhibited and presented a specimen of Infusorial Earth, from the neighborhood of Bangor, Maine. Copper was said to have been detected in the silica of which the specimen was composed.

Dr. J. C. White was appointed one of the Committee on Chemistry of the Department of Microscopy.

November 18, 1857.

The President in the Chair.

Dr. Hayes remarked that a specimen of Infusorial Earth, (which was afterwards identified as part of the specimen referred to in the proceedings of the last meeting,) given to him by Dr. A. A. Gould, had been submitted to chemical examination, without the detection of any compound of copper, either mixed or combined with it. The existence of copper, as part of the material of the Navicula, would be an interesting fact; but in the present state of our knowledge, there is no evidence afforded by chemical analysis in support of such an opinion.

Dr. Hayes stated, in connection with the reported presence of *cane sugar* in the expressed juice of the variety of sorghum cultivated somewhat extensively the last two years, that he had grave doubts of its production anywhere, as an immediate principle. One or two varieties of sorghum, which really produce cane sugar, had doubtless been cultivated, and had afforded sugar directly. Without having had an opportunity offered for an analysis of the secretion in the stalk, as cultivated so far south as where the ordinary cane can be reared, his most careful inquiries had resulted in the conclusion that there, as well as here, *glucose* alone is contained in the cells of the plant. In Georgia and South Carolina the utmost efforts to obtain sugar from the juice, both on the large scale of manufacture and in more refined and varied operations, have failed, and the most recent information includes the fact that the product, obtained in Louisiana, side by side with that of the ordinary cane, sent to St. Louis for refining, did not prove to be sugar. Masses of crystalline matter have been obtained by evaporating the syrup; but when it is remembered that a gallon of the expressed juice of the fully ripened plant contains more than an ounce of salts of potash, lime, &c., the production of a compound of glucose and salts is not surprising.

If the plant secreted cane sugar, we should not from analogy expect that a change of habitat, *allowing the plant to perfect its* *cells,* would lead to the formation of glucose only. Nor should we, in view of the experience, especially in our Southern States, meet with the two or three doubtful cases recorded of sugar product; but as in the beet, the maple, and the cane, sugar, as a *constant proximate constituent,* would be found in the sorghum juice.

The President gave an account of some observations on the development of Anableps Gronovii, as compared with that of the Embiotocas of California.

Prof. Agassiz has described these last as having a "true ovarian gestation." This statement is true, but in a somewhat different sense from that in which the development of Anableps may be considered ovarian. In Embiotocas the ovary is divided internally into numerous compartments by folds of lining membrane which project into its cavity; these folds are germ producing, as the young ova may be seen between their layers, even when the fœtuses are being developed in the cavity of the ovary. Nothing has been determined as yet as to the period when the ovum of Embiotocas leaves the ovisac, whether before or after impregnation. Wherever it has been observed, the fœtus has been found in the cavity of the ovary, enveloped in the longitudinal folds of its lining membrane. In Anableps, the gestation is carried on to its completion, or nearly so, in the ovisac; this last grows as the fœtus is developed, becomes quite vascular, and by its apposition with the vascular papillæ of the yelk sac, carries on those interchanges between the parent and the fœtus which are necessary for respiration and nutrition.

Dr. C. T. Jackson exhibited to the Society a portion of the supposed meteoric stone from Marblehead, which was brought to him for analysis on the 14th November.

He remarked that it bore so close a resemblance to the slag of a copper smelting furnace, that he at first hardly thought it worth the trouble of analyzing, but since it might become important to record the real composition of this alleged meteoric matter, he had made the analysis, with the following results per cent.:—

Per oxide of iron	=58.72=metallic iron, 41.12
Silica	34.48
Alumina	2.40
Magnesia	0.39
Sulphur (by difference)	4.01
	100.00

Search was made for nickel, copper, and chrome, but no trace of those metals was discovered. The proportions of iron and of silica were not different from those of meteoric stones, but perhaps the perfect oxidation and combination of the iron with the nitric acid was the strongest evidence of its terrestrial origin that the specimen presents; for even had nickel been discovered in it, this would not alone prove its celestial origin, since the copper ores worked at Point Shirley often contain nickel, which would be likely to be found in some of the slags.

Mr. Edwin Harrison, of Cambridge, reported the result of an analysis of two specimens of Magnetite, the first from the Iron Mountain, the second from the Pilot Knob, Missouri.

IRON MOUNTAIN ORE.

Iron	68.95
Oxygen	27.00
Sand and Silic. of Alum.	3.07
Manganese	(trace)
	99.02

Spec. grav., 3.997 at 13.°1 centigr.

PILOT KNOB ORE.

Iron	54.307
Oxygen	26.720
Insol. subs. in H. Cl.	17.509
	98.536

Spec. grav., 3.137 at 11.°5 centigr.

Mr. Sprague read the names of a small collection of cryptogamous plants brought by Dr. Samuel Kneeland, Jr., from the Lake Superior region, as follows, namely :—

Agaricus Orcella, Bull. ; *Lycoperdon pyriforme*, Schœff. ; *Polyporus perennis*, Fr., *hirsutus*, Fr., *Cetulinus*, Fr., *igniarius*, Fr., *applanatus*, Pers. ; *Tubercularia pezizoidea*, Schw. ; *Usnea longissima*, Ach. ; *Sticta pulmonaria*, Ach. ; *Neckera pennata*, Hedw.

These species are all common over a broad area of the United States. They are mainly interesting as defining their range, and showing how little change is exhibited in the growths of a region extending thousands of miles.

The President announced the resignation of Patrick T. Jackson, Esq., as Trustee of the Courtis Fund. It was voted to present the thanks of the Society to Mr. Jackson for his able and efficient services, and Mr. James M. Barnard was chosen Trustee of the Courtis Fund in his place.

December 2, 1857.

The President in the Chair.

Dr. C. T. Jackson observed that a question having been raised as to the variety of sorghum from which the crystallized cane sugar exhibited at the last two meetings was obtained, he now presented to the Society the panicle of the plant he had operated upon, with the ripe seed attached, which the members would observe was the true Chinese variety of the sorghum, and such as grows in this vicinity.

He also presented specimens of the fructification of that variety of the sorghum from Caffraria, called there the Imphée, which is suited only to warm climates, and will not ripen in New England, but which, in warm seasons, ripens in the Southern States.

He remarked that, after having both last year and this demonstrated that the Chinese sugar cane produces, when ripe, true cane sugar with its perfect crystals, having all the replacements and secondary forms belonging to cane sugar, and wholly incompatible with the forms of grape sugar, or glucose, and having publicly made this demonstration before the Society, by aid of excellent microscopes, he could not consider the nature of the sugar an open or undecided question, about which members had a right to entertain different opinions. It was an absolute demonstrated fact, beyond question. He had shown that the unripe plant produces grape sugar, which is readily crystallizable by suitable operations, and the form of those crystals is that of grape or fruit sugar, wholly incompatible with that of the cane sugar so abundantly found in the ripe plant. He stated that the ripe sorghum juice gives from 12 to 18 per cent. of saccharine matter, and, by the usual process of sugar-making in a practical way, nine per cent. of good crystallized cane sugar.

He had operated also on the Imphée, which, when unripe, gave also grape sugar, and, when ripe, good crystallized cane sugar. The failures alluded to by Dr. Hayes, as having taken place at the South, were from operations on the *unripe* Imphée in South Carolina.

Dr. A. A. Hayes read the following paper, on a chemical change which takes place in the glucose of the sorghum:—

In a paper communicated to this Society some months since, I alluded to the fact, that the glucose of the sorghum cultivated in New England, like fluid fruit sugar, passes to the condition of dry, or crystalline fruit sugar. The subsequent more careful investigation of this change led to the observation, that the action is *continuous*, proceeding indeed during many months, and resulting finally in the *production from pure glucose of sugar having the higher grade of a variety of beet root, or cane sugar.*

In the account which follows, the experiments were made on the glucose of that variety of sorghum which has dark purple seed coverings, the variety generally cultivated in our northern States.

When we extract the saccharine matter of the stalk of the sorghum, either by expression, or through the aid of water, and purify the solution by means of animal charcoal, we obtain glucose, holding in solution some salts of potash, lime, and soda. This glucose does not afford crystals by evaporation in desiccated air, nor does alcohol, saturated with cane sugar, leave undissolved any sugar.

The perfectly formed cells of the plant, triturated with animal charcoal, afford to boiling alcohol the same substance. The dry glucose is abundantly soluble in alcohol of 86 per cent., and the dense syrup of the same dissolves without limit in it. After exposure in warm air, crystalline concretions, resembling dry grape sugar, form in isolated masses. Analysis shows a large proportion of saline matter, composed of phosphoric acid, chlorine, sulphuric acid, acetic acid and potash, soda, lime, and oxide of iron. This saline matter forms a compound with the glucose, and thus makes up the crystalline grains, which first appear in the dense syrup. These are constant results, in treating the plant which has been cultivated the two past seasons, and they present no remarkable feature, in comparison with those obtained on glucose from other sources.

After the lapse of several weeks, however, the pure glucose which has been withdrawn from the foreign aggregates exhibits the production of crystalline points, which, becoming numerous, soon assume the forms of regular crystals. These crystals increase in volume, but while forming in the glucose they present skeletons, rather than solid crystals, of a pure substance, and are often grouped. Crude syrup, remaining after the concentration of the juice by rapid boiling, undergoes the same modification, and crystallized sugar slowly separates from samples which originally did not contain any.

Slips of the pith of the plant, which had been carefully examined under the microscope, without any traces of crystals being found, after some months, show their cells filled with voluminous, dry crystals. Repeated trials prove that the chemical change, resulting in the production of the crystals, from glucose, is not dependent on exposure to air and loss of water, but it takes place when the syrup is kept in closed bottles.

As the glucose is abundantly soluble in alcohol of 90 per cent., this agent enables us to learn at any moment the production of sugar in a sample ; the sugar when formed being nearly insoluble in cold alcohol. Thus, when a certain number of crystals have formed, if we withdraw by solution in alcohol the unchanged glucose, and after dissipating the alcohol, allow it to repose, crystallization recommences in the portion removed, and repetitions of this experiment may be made, until after about ten months, small portions only of unaltered glucose remain.

Although the evidence of the conversion of the glucose, step by step, into sugar, afforded by the action of alcohol, is important, the observations here recorded are based upon experiments made in a similar manner, with the alkaline solution of tartrate of copper, and acidulated alcohol saturated with cane sugar ; they leave no doubt that the normal saccharine juice of the plant becomes, *per se*, converted into sugar, forming regular crystals of large size. These crystals, by solution in water, are easily purified, losing their porous structure and becoming solid, transparent, and colorless modifications of the rhombic prism from an aqueous solution. They are always apparently more voluminous than the crystals of cane sugar, formed under like circumstances, but they have all the brilliancy of cane sugar. In chemical characters, the most pure crystals yet obtained show a diversity when compared with cane or palm sugar. They are less soluble in water ; in sulphuric acid they do not exhibit the same depth of coloration that cane sugar does. With the copper test, a partial reduction takes place, under the same conditions, where cane sugar does not produce change on this agent.

The conclusion reached is, that this sugar, wholly unlike any variety of glucose or fruit sugar, belongs to a higher class, and probably will rank with beet sugar, in most of its characters.

The present is the first instance, within my knowledge, of the conversion of any variety of glucose into a sugar of high grade, after its extraction artificially.

Dr. Jackson remarked that the statements made by Dr. Hayes in his paper were so extraordinary, and so opposed to the experience of both scientific and practical men, that those results should be verified by others before they could be believed. If Dr. Hayes had discovered that the juice of the sorghum, after it was expressed, would change, *per se*, into cane sugar, it was a most important discovery; for no chemist or practical operator had ever attained such a result. Dr. Jackson was aware that starch changes into dextrine, then into grape sugar, and lastly into cane sugar, in the living organism of the plant, and that some of these changes could be effected by chemical art, but thus far no one had ever known grape to change into cane sugar out of the living organisms, though the contrary operation was not uncommon, namely, the conversion of cane sugar into glucose, or even mannite.

Up to this time we are not aware that any authority states that glucose can, by the action of any salts, be changed into cane sugar.

He remarked that the term cane sugar was not restricted to a species, but to a group or family, having a rhombic prism for the primary form, and that there was undoubtedly some slight difference to be found in the dimensions of their crystalline angles, all of which, however, fall within the limits of the general form known as that of cane sugar, and are incompatible with grape sugar, which belongs to the cubic system. The sugar of the ripe sorghum has the crystalline form, and all the physical and chemical properties of cane sugar, and cannot be classed with any other. It exists ready formed in the cells of the plant, and may be seen by aid of the microscope in them when the plant is dried rapidly. It is obtained immediately on expression of a few drops of the juice upon a plate of glass, on which perfect crystals of cane sugar are seen by the microscope.

Dr. David F. Weinland made some extended remarks upon the Parasites of man, giving an account of their early history, from the time of Aristotle to the present day.

After alluding to the two genera of Tapeworms described by Bremser, and a third genus, a species of which has been described by Kuchenmeister, Dr. Weinland announced the discovery of a fourth genus, which he names *Acanthotrias* (three rows of hooks). Thus far he had seen it only in the cysticercus stage. It has fourteen hooks in each of the three rows, the uppermost row being the shortest. The specimen came from a dissecting-room subject, in one of the Southern States, which very probably may have been a Negro. The *Tænia solium* is found in England, Germany, and America. The *Botriocephalus latus* is limited to Switzerland and Russia, or, in the exceptional cases where it has been found in Germany, the person from whom it was taken had been to Switzerland. It remained to be determined if the new genus was peculiar to the negro race.

A discussion ensued as to the manner in which these worms are introduced into the human body, the degree of heat requisite to destroy their vitality in the process of cooking, and the action of salt upon them.

Dr. Weinland suggested that they might be introduced into the human body with butter and other articles, which had been cut with the same knife as measly pork, which, it is well known, is a mass of the cysticercus stage of the tapeworm.

Dr. J. C. White said, that, in Germany, the ova of tapeworms were frequently found upon the green vegetables used for salad.

Mr. F. H. Storer said that raw ham and pork are frequently eaten in Germany.

Dr. Chas. Pickering said that it had been noticed, in the Western States, that the tapeworm is much more frequently found in the immigrants from Europe than in the Americans.

Mr. John Green said that John Hunter speaks of a worm which was found alive in a carp which had been boiled.

Dr. Weinland said that, in the instances where worms were supposed to have been found alive in cod and other fish, their motion was, most probably, not one of vitality, but due to the elasticity of their tissue.

Dr. A. A. Gould stated that several hundred hogs were lost in East Cambridge, during the last summer, from the measly disorder.

Mr. N. H. Bishop exhibited a pair of Albino Rats, which were caught under a barn in Medford, near the Mystic River.

The President, in reply to a question from Dr. Gould, said he believed albinos always propagated albinos. They certainly do through several generations.

Dr. Weinland said he had noticed that if one of the parents has a single dark spot, however small, the pigment shows itself first in the eye of the offspring.

DEPARTMENT OF MICROSCOPY.

Dr. S. Durkee exhibited some of the Red Snow (*Protococcus nivalis*) from Greenland, belonging to the Bailey collection.

Mr. John Green stated that he had found the same or a similar plant near Portland, Maine, growing in the hollow of a rock. The plant contained in its cells nuclei of a greenish color.

December 16, 1857.

The President in the Chair.

Mr. Charles Stodder read a report upon the substance known as Gum Lahoe, which was referred to him at the previous meeting for examination, as follows:—

GUM LAHOE.

The specimen is an amorphous mass, made up of foldings of two colors, shades of brownish drab with some very dark brown spots, which seem to be derived from bits of bark and wood. The two shades of drab appear to be identical in every respect except color. It has a slight peculiar odor, is somewhat friable, as it breaks before a knife, and is non-electric. It bears no resemblance whatever to caoutchouc, or any of the varieties of the so-called gutta percha. Its external characters mostly resemble those of pitch.

It is insoluble in water, cold or hot, but softens with heat. In boiling water it is almost fluid, and particles of bark and wood separate, leaving the gum nearly clean. In this state it is very adhesive, tenacious, and may be drawn into threads and sheets of great tenuity. It may thus be rendered somewhat elastic, and nearly transparent. When cold it hardens very slowly, and is compact, homogeneous, and very adhesive. After exposure to a temperature of 32°, or, during one or two days, to a temperature of from 40° to 60°, it acquires a little brittleness, but readily softens by the warmth of the hand and becomes plastic. It becomes of a dark color upon working it in the hands a short time.

It is insoluble in cold or hot alcohol. In boiling alcohol it behaves the same as in boiling water, except that, the temperature being lower, it is not so fluid ; after boiling in alcohol it is more brittle than after boiling in water. Left in alcohol for several days after boiling, a white flocculent matter, heavier than alcohol, is separated ; upon boiling the alcohol with the flocculi and the gum, the former totally disappear, leaving the solution clear. It is soluble in cold oil of turpentine, naptha, and chloroform, more readily and in greater quantity than gutta percha. It is also readily soluble in sulphuric ether. Solutions in oil of turpentine, naptha, and ether are heavier than the solvent ; those in chloroform are lighter.

It burns with much flame and smoke ; immediately before burning, it melts into a transparent amber-colored fluid. Exposed to a temperature above that of boiling water, it melts, boils, and swells, with the rapid escape of gas. The amount of the residue is much less than that of the original, but it seems to possess nearly the same properties ; this point, however, was not fully examined.

It is a vegetable product, intermediate with the resins and gutta tuban or percha.

Dr. A. A. Gould read a communication from Dr. Skilton, of Troy, N. Y., upon Equus Major, as follows :—

EQUUS MAJOR.

The last summer, 1857, Col. Leonard McChesney found, in his ploughed field in Brunswick, one mile from the city of Troy, a number of teeth of the Fossil Horse; the spot of marshy ground where they were found had, by trenching, been converted into a fine soil for garden crops. Mr. McChesney has been so fortunate as to find two incisors, slender in form; of the lower jaw, both the first molars, and three out of the next four molars on each side, viz: second, third, fourth, and fifth; of the upper jaw, the left first molar, and three on each side of the next four molars,—embracing of this animal's teeth seventeen. Of all the Fossil Horse teeth we have seen, there is decayed out of them all the fangs and bony parts, some of the dentine, and in this instance more or less of the ends of the plates of enamel. The length of the enamel of the first upper molar still remaining is 1.9 in., ditto the first lower molar is 2.33 in.; length of longest upper molar is 2.9 in., ditto longest lower molar is 3 in., ditto of incisors, 2 in.

Dr. Dekay, at the time of the publishing of "The New York State Natural History," had not learned of the discovery of any fossil horse remains in this State.

Some four or five years since, a lower first molar, in a fine state of preservation, was picked up by the writer's son, George S. Skilton, on the margin of one of the rivers near Troy.

Dr. J. C. White read a paper on the development of Tapeworms, as follows:—

GENERATION OF THE HELMINTHES.

I thought it might not be uninteresting, after the interest evinced by the Society at the last meeting on the subject of the Helminthes of the human body, to give, in a few words, the ideas now prevalent in Germany in respect to their development.

Let us take the joint or proglottis of a *Tænia solium*, and watch it through its phases. We know that it is a perfect individual by itself, capable of reproducing, and that when mature and filled with eggs it becomes congested, separates itself voluntarily from its next younger joint above, and is discharged. We will suppose now that by some means to be presently considered, the eggs regain entrance within the intestinal canal after their wanderings. Each ripe egg or embryo consists of a body armed with three pairs of hooklets, by which it is able to burrow in tissues, and make its way to any part of the human system. After it has found its proper nidus, be it muscle, brain, eye, or other organ, and has become encysted, its hooklets drop off, and from its walls a protuberance grows inwards, which gradually changes into a head, neck, and body, or, in other words, becomes the scolex. This at first remains enclosed within the embryonic bladder as a receptacle, but later the animal pushes itself free. Its head has now become that of the true Tænia, and from it depends the former receptacle as a bladder. Siebold maintains that this cyst is only a joint of the scolex, which has become dropsical; but Küchenmeister (and his views are adopted by all modern pathologists) insists that this is another stage of development, and the normal condition of the animal. Now, unless the encysted animal is set free artificially, the generation stops here; but if, in any way, it escape, and again find entrance within the intestinal canal, it fastens itself by its head to the walls, its bladder drops off, leaving behind the marks of attachment on the oldest joint, and in its place the true joints of the Tænia are developed, forming the animal with which we started.

It is only by this method that a Tænia can be produced; for the eggs or embryos of the proglottis either pass into the tissues, and become there encysted scolices or nurses, or else pass away with the fæces. At all events, they are never converted primarily into Tæniæ, else we should find tapeworms as plentiful as ascarides. To account for the production of Tæniæ, therefore, we must admit the scolex within the intestinal canal, and this may be done more easily than we imagine. The head of the Cysticercus is but a mere mite, and it is not necessary that its bladder should accompany it, which, as above mentioned, drops off, leaving behind the mark of its former attachment. We know how general a disease this parasite forms among swine; but it is not wholly confined to them; for we find it also, though seldom, in the bear, deer, and ox, not to mention many other animals, so that nations who eat no pork may be infested by Tæniæ. It is probable that many scolices may pass through the intestinal canal of man, and yet not generate the tapeworm, for it must attach itself to its walls before the joints are produced.

Some authorities would have it that the embryo discharged from the proglottis is capable of an immediate conversion into the scolex by burrowing into the soft tissues of the same individual; but it is more probable that the eggs must first leave the intestine, and mature outside, since scolex seldom occurs together with Tænia, and then it is probably accidental. When the mature proglottis is discharged from the intestine, it deposits its eggs in moist earth, on plants, in the water, and so on. These eggs are covered with a very thick membrane, which withstands much pressure between the glasses of a microscope, and they are capable of remaining a long time quiescent, like other parasitic ova, till a suitable menstruum is found for their development. That they may pass into the stomach of man and other animals with various articles of diet and drink is unquestioned; for they are found in water, and on salads and other vegetables, which are eaten without being previously cooked, and sometimes not even washed.

The genus Tænia still requires much study to remove the doubt which rests upon several species. Five or six are known, which find a habitation in man, (*T. solium ; nana ; mediocannellata ; echinococcus ; T.* of Good Hope ; and *T.* or *Bothriocephalus latus*,) one of which wants the hooklets peculiar to the rest. They may be found wanting also in *T. solium*, in some instances. Of these species the scolices are unknown, with the exception of Cysticercus and Echinococcus. The encysted form of Bothriocephalus may have been confounded with that of *T. solium*. The joints of this worm are thrown off in chains, and not singly, as with Tænia. Two varieties of the Cysticercus have been observed.

Of course, after the adoption of the scolex theory, it became interesting to inquire where the Tænia of the common Echinococcus had been all this time. Siebold thought that the Tænia of the dog was the animal in question; for he gave the Echinococcus of animals, *E. veterinorum*, to dogs, and at the end of twenty-two days found in their intestine a Tænia with but three joints; the last one perfect, however, showing that the animal had arrived at maturity. This view was generally adopted till quite recently, when Küchenmeister showed that the *E. veterinorum* differed from *E. hominis* in the form of its hooklets, and he gave some of the latter in soup to a criminal condemned to be executed, and on dissection a Tænia very like *T. solium* was found, with but three joints, and bearing a head of Echinococcus. This *T. echinococcus*, as he calls it, had so long escaped observation only from its diminutive size, it being only three lines in length. The last proglottis of the three was perfect, and contained the sexual organs. This is a late discovery, and must not be confounded with *T. echinococcus* of Siebold, who made the *E. hominis* and *E. veterinorum* the same species.

In our study of these important and interesting parasites we notice three stages of development. First we see the proglottis leaving the intestine, and apparently seeking in the outer world of light and pure air some element, of which we are ignorant, for the development of the embryo. It possesses fibres capable of contracting after it has left the body, and finally discharges its eggs from the ovi-sac. These lead a nomadic life till by chance they once more gain admittance to their old haunts, where, instead of remaining contented, they burrow at once into the tissues, and then, after the formation of a head, leave them again, if possible, to resume their former quarters in the intestine, where the last stage of development is completed.

We can but notice that the Tænia feeds upon matter which has not been oxygenized or converted into tissue; whereas in its other state it exists upon the substance of animal life itself. Rokitansky noticed in the bladder of a Cysticercus, found in the brain, shreds of nerve fibre; and they must obtain from the human tissues they prey upon the great amount of calcareous matter found in their concentric corpuscles. What the object of these is no man knows; but the advancement in this branch of observation within the last few years leads us to hope that light may be thrown upon many points in their history, now obscure.

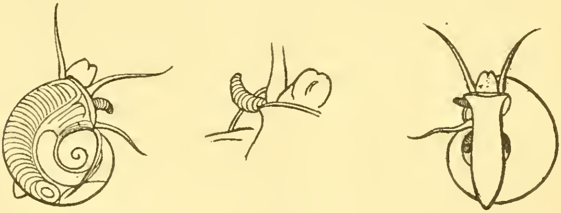
Dr. Gould read a communication from Mr. William Stimpson, upon a new form of parasitic gasteropodous mollusca, which he calls *Cochliolepis parasiticus*, as follows:—

In the spring of 1852, while investigating the marine fauna of the coast of South Carolina, in company with my friend, Lieut. T. D. Kurtz, U. S. A., I had the fortune to meet with a new form of parasitic gasteropodous mollusca, living under circumstances quite unique in this order. We had succeeded in capturing some gigantic annelides of the *Aphrodita* family, (*Acoëtes lupina*,) which lived in thick leathery tubes, extending down two or three feet into the mud near low-water mark. Upon drawing one of these worms from its domicil, some bright blood-red objects were found concealed under its scales, which, upon examination, proved to be little shells, resembling in size and shape our common *Planorbis exacutus*. These were placed in a watch-glass of sea-water, and drawings made of them, which are presented herewith.

The publication of these figures has been delayed, in the hope that opportunity would occur for a more thorough investigation of the structure of the animal, with the view of determining its place in the system. It has not, however, since been met with; and as the subject is one of great interest, I have been led to give at this time such information as could be collected from the specimens first discovered.

For this curious animal, which evidently forms a new genus and species, I would propose the name

COCHLIOLEPIS PARASITICUS.



The animal was of a blood-red color; foot oblong, tapering behind with a rounded extremity, slightly auricled before, anteriorly bimarginate. Head small, rounded and notched in front, without veil. Tentacles slender, tapering, equalling in length the diameter of the shell. Eyes none. (?) A small supplementary plicated gill on the right side, projecting out freely beyond the aperture of the shell, and attached only at its constricted base. Two long cirri arise from the body on the right side, near the junction of the mantle ; these protrude like vibracula from the superior angle of the aperture, when the animal is in motion. Operculum thin, flexible, and pellucid.

The shell is thin, discoidal, convex above, concave and umbilicated below; the edge thin and sharp. Whorls three in number, rapidly enlarging. Surface smooth and glossy, indistinctly striated with lines of growth. Lip not thickened. Diameter one eighth of an inch.

Hab. Harbor of Charleston, S. C. ; parasitic on *Acoëtes lupina.*

Dr. B. J. Jeffries exhibited the Atlas and Axis of a man about fifty-five years of age, and very muscular. The Odontoid Process was not united with the Axis.

Mr. Edward Daniels, State Geologist of Wisconsin, and a corresponding member of the Society, presented a number of geological specimens from that State, and remarked as follows :—

Occurring throughout an extensive district of Eastern Wisconsin and Northern Illinois, is a rock of Upper Silurian Age, clearly corresponding to the Clinton or Niagara groups of the New York Reports. In numerous localities, this rock contains cavities and thin seams filled with solid bitumen, which is frequently found in the digging of wells and cellars, and is commonly called coal. Near Chicago, is an outcrop of this rock, in which bitumen is very extensively found, in fluid form at ordinary temperatures, as well as in the solid state. The cavities sometimes contain half a pint. The rock is an Encrinal Limestone, the encrinal forms being quite distinct in the northernmost portions of the district. From the walls of a church erected of this stone the bitumen has exuded and run down in streams, giving the building the appearance of some of the ancient ruins of Europe. The scale of bitumen peels off, however, after some time. Quarries have been opened in the limestone to the depth of fifteen feet. A few corals are found in it, and occasionally some of the larger corals.

Mr. Daniels also presented some minute Trilobites, and other fossils, from the base of the Potsdam Sandstone of Wisconsin. The localities were various: the valley of the Black River, in the northwestern part of the State, the mouth of Black River, and a spot sixty miles up the same river. He stated that they were interesting, being the oldest fossil forms yet found in this country, the sandstone resting directly upon the upturned edges of the Azoic rocks. Upon a small island in Black River he had found perfect impressions of Crustaceans, consisting of double rows of parallel tracks, precisely like those in Montreal.

Mr. John Green—referring to a specimen of Silicious Infusorial Earth presented to the Department of Microscopy, November 4, 1857, and which was at that time said to contain copper—stated that other samples of the earth had since been analyzed by Mr. Albert Gould, of the Lawrence Scientific School, with the following result, viz:—

Organic Matter and Water - - -	14.48
Silicic Acid - - - - - -	82.03
Carbonate of Lime - - - - -	0.32
Oxide of Copper - - - - -	0.89
Sesqui-Oxide Iron and Alumina - -	1.47
Loss - - - - - - - -	0.81
	100.00

This result is the mean of two determinations.

Mr. Gould stated that the specimens came from a pond in Beddington, Maine, between ten and fifteen feet in depth, and about eight or ten acres in extent. When treated with boiling chlorohydric or nitric acids concentrated, no copper was found by the sulphuretted hydrogen test. The same was the case with diluted aqua regia. When boiled with concentrated aqua regia for an hour, some copper was found; but when it was fused with carbonate of soda, which certainly was itself free from copper, nearly one per cent. of copper was obtained. Before the blowpipe also, on charcoal, a spangle of metallic copper was seen.

From the action of alkalies it would appear that the copper was combined with silica, and not an accidental ingredient.

Dr. H. R. Storer exhibited a Porcupine, (*Hystrix dorsata*, Lin.,) shot in New Hampshire, and belonging to the collection of Master Frederic Gilmore. He also exhibited, in connection with it, the representation of this animal, figured by Audubon and Bachman, showing it to be extremely inaccurate.

Messrs. John D. Philbrick and Edward P. Jeffries were elected Resident Members.

DONATIONS TO THE MUSEUM.

October 7, 1857. A fragment of a Human Cranium, which was said to have been found in deposits coeval with the Mastodon, in California; by Dr. C. F. Winslow. Specimens of intergrowing and intertwining woods from Surinam; by Dr. Jeffries Wyman. A collection of Radiata from the Gulf of St. Lawrence, and a Fish from the North Atlantic Ocean, which probably belongs to a genus new to North America; by Capt. N. E. Atwood. A collection of Crustacea made in California by Mr. E. Samuels, containing fifteen species, viz: *Chionœcetes Behringianus*, *Epialtus productus*, *Cancer gracilis*, *C. productus*, *C. antennarius*, *Pachygrapsus crassipes*, *Pseudograpsus Oregonensis*, *P. nudus*, *Hippa analogica*, *Porcellana rupicola*, *Gebia Pugettensis*, *Callianassa longimana*, *Astacus Trowbridgii*, *Crangon Franciscorum*, *C. nigricauda*; by E. Samuels. Crustacea from the Northwest Coast of the United States; by the Smithsonian Institution. A collection of Animals in alcohol, made by Dr. S. Kneeland, Jr., in the region of Lake Superior; by Dr. S. Kneeland, Jr. The Skin of a Ray; by Dr. D. H. Storer.

October 21. Microscopic preparations of the Diatomaceous Exuviæ of the Post-tertiary Sand of Glenshira, near Inverary, Scotland; by Prof. Gregory of Edinburgh. A collection of Minerals made in the mining districts of Lake Superior; by Dr. S. Kneeland, Jr. A collection of Algæ from Australia, Ceylon, and the Friendly Islands, prepared by Prof. Harvey; by Dr. Benjamin D. Greene. A Red Phalarope, *Phalaropus fulicularius*, Bonap. shot on Charles River; by C. W. Lovett, Jr. A Fish from Boston Harbor; by E. Samuels.

November 4. A section of an elm exhibiting a singular curved growth; by Prof. Theophilus Parsons. A living specimen of young Bald Eagle, *Haliaetus leucocephalus*, Linn. taken upon the shore of Lake Superior, and specimens of copper, veinstones, agates, and crystals from Portage Lake; by Samuel M. Nason. Crustacea, Shells, Insects, &c. from Portage Lake, Agates from the Mississippi River, near Winona, Minnesota. and some very productive soil from the borders of Rice Lake, Steele Co., Minnesota; by Dr. S. Kneeland, Jr. A Spider, *Epeira insularis*, Hentz, and some shells; unknown Donors. A Bird's Nest; by Mrs. C. W. Dall. Infusorial Silicious Earth, containing Copper, from Beddington, Maine; by Prof. Theophilus Parsons.

November 18. A specimen of Platycarcinus Sayi from Labrador, heretofore unnoticed north of Massachusetts; by Dr. H. R. Storer. Three species of Crustacea from California, viz: *Sphæroma Oregonensis*, *Idotœa Wosnessenskii*, and *Livoneca vulgaris;* by E. Samuels. The sternum and scapular arch of the following twenty-nine birds, viz: Sharp-shinned Hawk, male and female; male Sparrow Hawk; Barred Owl, female; Acadian Owl, male; Belted Kingfisher, male; Black-capped Titmouse; Canada Jay, female; Blue Jay; American Raven; Rusty Grakle; Lesser Red-poll Snow Finch, male; White-throated Sparrow, male; Snow-Bunting, also the skull and foot ; Pine Grosbeak, also the skull; Common Crossbill, also the skull; Three-toed Woodpecker, two specimens; Hairy Woodpecker, female, also the skull; Pileated Woodpecker; Golden-winged Woodpecker, male; Ring-neck Plover, male; Tell-tale Tatler, female; Solitary Tatler, male; Common Snipe, female; Sora Rail, female; Snow Goose; Summer Duck, male, also the trachea; Dusky Duck, female; and Green-winged Teal. Also the stuffed skin and the skeleton of the Northern Flying Squirrel, *Pteromys sabrinus*, Penn., from Lake Superior; and from the same locality, two nests of the paper-making wasp, a fresh-water shell, and a piece of cedar perforated by boring insects; also, Cryptogamia, viz : *Agaricus orcella*, Bull. *Lycoperdon pyriforme*, Schæff. *Polyporus perennis*, Fr. *P. hirsutus. P. Cetulinus. P. ignarius. P. applanatus*, Pers. *Tubercularia pezizoidea*, Schw. *Usnea longissima*, Ach. *Sticta pulmonaria*, Ach. *Nechera pennata*, Hedw. All from the Lake Superior Region; by Dr. S. Kneeland, Jr. The Osseous Schlerotic Coats of the Eyes of the Sword Fish, Mackerel, and Coryphœna; by John Green, Jr.

December 2. Flint, imbedding chalk, from the island of Rügan, in the Baltic Sea; by Dr. Wm. P. Dexter. A sample of Gutta Lahoe from the East Indies; by C. L. Andrews. Aspergillum Javanense; by Capt. Thomas Andrews. Impressions in clay of Raindrops and drops of falling water; by Dr. Jeffries Wyman. A copy of Mrs. Redfield's Chart of the Animal Kingdom; by Messrs. E. B. & E. C. Kellogg, of Hartford, Conn. Skeleton of an American Raven, *Corvus cacalotl*, Wagl. from Lake Superior; by Dr. S. Kneeland. Two Fishes; by Dr. D. H. Storer.

December 16. The Panicles of several varieties of Sorghum and Imphee; by Dr. C. T. Jackson. A collection of Crustacea, many of them described in the Massachusetts Reports; by Dr. A. A. Gould.

BOOKS RECEIVED DURING THE QUARTER ENDING DEC. 31, 1857.

Transactions of the Illinois State Agricultural Society. Vol. 2. 8vo. Springfield. 1856-7. *From I. A. Lapham.*

Memorial of the Inauguration of the Statue of Franklin. 8vo. Boston. 1857. *From the City of Boston.*

Address on the Scientific Life and Labors of W. C. Redfield. By D. Olmsted, LL.D. 8vo. Pamph. New Haven, 1857. *From the Author.*

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January 6, 1858.

The President in the Chair.

Mr. Charles J. Sprague read the following paper, entitled,

CONTRIBUTIONS TO NEW ENGLAND MYCOLOGY.

In the Proceedings of the Society, March 5, 1856, is a list of Fungi collected in this vicinity by Mr. Denis Murray and myself. It was prepared as a commencement of an enumeration of the Fungi of New England, of which there is no authentic list in existence. The collections heretofore made have been chiefly incidental, as no botanist has devoted his special study to the Mycology of this region; and the published accounts of such species as have been collected are not easily obtained.

Since the publication of the list referred to, I have continued to devote what leisure I could spare to this neglected study, and have now some hundreds of species to add to my former list. Mr. Murray has contributed a large proportion of them, and deserves great credit for his indefatigable prosecution of this interesting pursuit.

The plants have all passed through Dr. Curtis's hands, and the new species have been named by him and the Rev. Mr. Berkeley together. I have incorporated in the list the names of several species, communicated to me by Dr. Curtis, which were collected by Mr. Charles Wright in Connecticut, and by the Rev. Mr. Blake in Maine; and also a few received from the Rev. Mr. Russell of Salem.

The names of 400 species are given, which swell the number of authentic New England Fungi to 678. Of the following list, 73 are entirely new to science.

I have appended Mr. Murray's name to such species as have been collected by him alone.

HYMENOMYCETES.

Agaricus virosus, Fr. Conn. Wright.
" phalloides, Fr.
" muscarius, L.
" scandicinus, Fr. Conn. Wright.
" vaginatus, Bull.
" procerus, Scop.
" rachodes, Vitt. D. Murray.
" cristatus, Fr. Conn. Wright.
" Badhami, B. & Br. " "
" granulosus, Batsch.
" melleus, Vahl.
" rutilans, Schæff.
" scalpturatus, Batsch.
" Spraguei, B. & C. *ined.*
" graveolens, Pers. D. Murray.
" tigrinus, Bull. "
" Murraii, B. & C. *ined.*
" quadratus, B. & C. *ined.* Maine.
" præceps, B. & C. *ined.* D. Murray.
" ochro-purpureus, B.
" infundibuliformis, Schæff.
" pithyophilus, Fr. Maine.
" nebularis, Batsch.
" confluens, Pers. Conn. Wright.
" tuberosus, Bull. Maine.
" radicatus, Reth.
" hepaticus, Batsch. Conn. Wright.
" Oniscus, Fr.
" umbelliferus, L. Conn. Wright.
" fibula, Bull. Conn. Wright.
" ulmarius, Bull.
" mastrucatus, Fr. White Moun. Oakes.
" perpusillus, Fr. Conn. Wright.
" parvulus, Wein. D. Murray.
" sinuatus, Fr.

Agaricus elodes, Fr. Conn. Wright.
" Batschianus, Fr. " "
" majalis, Fr. " "
" prunulus, Scop. " "
" Orcella, Bull.
" pascuus, Pers. Conn. Wright.
" præcox, Pers. " "
" marginatus, Bat. " "
" mycenoides, Fr.
" dulcamarus, A. & S. Conn. Wright.
" lacerus, Fr. Conn. Wright.
" rimosus, Bull. " "
" auricomus, Batsch. Conn. Wright.
" trechisporus, B. Conn. Wright.
" abortiens, B. & C. *ined.*
" furfuraceus, Pers. Conn. Wright.
" malachius, B. & C. *ined.*
" pediades, Fr. Conn. Wright.
" fabaceus, Berk.
" appendiculatus, Bull.
" udus, Pers. Conn. Wright.
" obtusatus, Fr.
" Phalænarum, Bull. Conn. Wright.
" semihærens, B. & C. *ined.* Conn. Wright.
" retirugis, Batsch. Conn. Wright.
" hydrophorus, Bull. Conn. Wright.
" trepidus, Fr. Conn. Wright.
Coprinus fimetarius, L. " "
" Wrightii, B. & C. *ined.* Conn. Wright.
Cortinarius collinitus, Fr. Conn. Wright.
" elatior, Fr.
" sanguineus, Jacq.
" ileopodius, Fr. Conn. Wright.

Cortinarius anomalus. Conn. Wright.
“ ochroleucus, Schæff.
“ castaneus, Bull. Conn. Wright.
Paxillus panuoides, Fr. D. Murray.
“ griseo-tomentosus, Fr,
“ nigro-tomentosus, Fr.
Hygrophorus aurantio-luteus, B. & C. *ined.* Conn. Wright.
“ miniatus, Fr.
“ ceraceus, Wulf. Conn. Wright.
“ psittacinus, Schæff.
“ coccineus, Schæff.
“ conicus, Scop.
Lactarius scrobiculatus, Fr. Conn. Wright.
“ torminosus, Schæff. Conn. Wright.
“ hygsinus, Fr.
“ viridis, Fr.
“ volemus, Fr.
“ picinus, Fr.
“ calceolus, Berk. D. Murray.
Russula emetica, Fr.
“ virescens, Schæff.
“ fœtens, Pers.
Cantharellus floccosus, Schw. Maine.
“ umbonatus, Fr.
“ Wrightii, B. & C. *ined.* Conn. Wright.
Marasmius oreades, Bolt.
Lentinus Lecontei, Fr.
“ tigrinus, Bull. Conn. Wright.
“ cochleatus, Fr. “ “
Panus rudis, B. & C. *ined.* “ “
“ lævis, B. & C. *ined.*
“ operculatus, B. & C. *ined.* D. Murray.
Lenzites Berkeleii, Lév. D. Murray.
“ sepiaria, Fr. Maine. J. Blake.
“ Cratægi, Berk. D. Murray.
Boletus flavidus, Fr.
“ bovinus, L.
“ piperatus, Bull.
“ subtomentosus, L.
“ spadiceus, Schæff. Conn. Wright.
“ luridus, Schæff.
Boletus scaber, Fr.
“ felleus, Bull.
“ castaneus, Bull.
Polyporus poripes, Fr.
“ leucomelas, Fr.
“ Schweinitzii, Fr.
“ Boucheanus, Klot.
“ luridus, B. & C. *ined.*
“ Spraguei, B. & C. *ined.*
“ anax, B. & C. *ined.* C. L. Andrews.
“ lacteus, Fr.
“ epileucas, Fr.
“ nidulans, Schæff.
“ radiatus, Fr.
“ igniarius, Fr.
“ carneus, Nees.
“ annosus, Fr.
“ salicinus, Fr.
“ spissus, Schw.
“ hirsutulus, Schw. Conn. Wright.
“ decipiens, Schw.
“ virgineus, Fr.
“ medulla-panis, Fr. Conn. Wright.
“ contiguus, Fr.
“ bombycinus, Fr. Conn. Wright.
“ mucidus, Fr. D. Murray.
“ fusco-carneus, Pers. Conn. Wright.
“ amorphus, Fr. D. Murray.
“ lentus, Berk. Conn. Wright.
Trametes benzoina, Fr. D. Murray.
“ odorata, Fr.
Dædalea cinerea, Fr.
“ confragosa, Pers. Maine.
Cyclomyces Greenei, Berk.*
Merulius porinoides, Schw. D. Murray.
Hydnum suaveolens, Scop. “
“ velutinum, Fr. “
“ graveolens, Delast. “

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* This plant was discovered some years ago, by B. D. Greene, Esq., in Tewksbury, Mass., and named after him by Dr. Berkeley. It has recently been found in the neighborhood of Boston, both by Mr. Murray and myself.

Hydnum Erinaceus, Bull. D. Murray.
" membranaceum, Bull. "
" pithyophilum, B. & C. *ined.* Conn. Wright.
" plumosum, Duby. D. Murray.
" Murraii, B. & C. *ined.* D. Murray.
" epiphyllum, Schw. D. Murray.
Phlebia vaga, Fr. Conn. Wright.
" cinnabarina. D. Murray.
" merismoides, Fr. "
Craterellus lateritius, Berk. "
" crispus, Fr. "
" clavatus, Fr. "
Thelephora trifaria, B. & C. *ined.* D. Murray.
" vialis, Schw.
" laciniata, Pers. D. Murray.
Auricularia mesenterica, Bull. Maine.
Stereum Micheneri, B. & C. *ined.* D. Murray.
" spadiceum, Fr.
" tabacinum, Fr.
" crocatum, Fr.
" imbricatulum, Schw.
" Murraii, B. & C. *ined.* D. Murray.
Corticium evolvens, Fr. Conn. Wright.
" scutellare, B. & C.
" lilacinum, B. & C. *ined.* Conn. Wright.
" Auberianum, Mont. Conn. Wright.
" pauperculum, B. & C. *ined.* Conn. Wright.
" acerinum, Pers.
Cyphella capula, Fr. D. Murray.
Clavaria aurea, Schæff.
" abietina, Schum.
" formosa, Pers.
" fragilis, Holms. D. Murray.
" pistillaris, L.
Tremella vesicaria, Bull. D. Murray.
" foliacea, Pers.
" sarcoides, With.
Exidia cinnabarina, B. & C. *ined.* D. Murray.
" obliqua, B. & C. *ined.* D. Murray.
Næmatelia nucleata, Fr. Conn. Wright.
Typhula muscicola, Fr.

GASTEROMYCETES.

Lycoperdon Wrightii, B. & C. *ined.* Conn. Wright.
" Curtisii, Berk. *ined.* Conn. Wright.
" Bovista, L.
Phallus duplicatus, Bosc.
Corynites Curtisii, Berk. Conn. Wright.
Scleroderma Bovista, Fr. Conn. Wright.
Polysaccum Pisocarpium, Fr. D. Murray.
Reticularia umbrina, Fr. "
Didymium melanopus, Fr. J. L. Russell.
" nectriæforme, B. & C. *ined.* D. Murray.
" xanthopus, Fr. Conn. Wright.
" squamulosum, Fr. Conn. Wright.
Physarum album, Fr. Conn. Wright.
" nutans, Pers. " "
Stemonitis ovata, Pers. Maine, E. S. Morse.
" obtusata, Fr. Conn. Wright.
Cribraria intricata, Schrad.
Arcyria nutans, Grev. Conn. Wright.
Trichia varia, Pers. " "
" clavata, Pers. " "
" chrysosperma, D. C. J. L. Russell.
Cyathus Lesueurii, Tul. Conn. Wright.
" Wrightii, B. & C. *ined.* Conn. Wright.
Sphærobolus stellatus, Tode. D. Murray.

CONIOMYCETES.

Leptostroma vulgare, Fr. D. Murray.
Phoma macropus, B. & C. *ined.* "
" confluens, B. & C. *ined.* Conn. Wright.
" depressum, B. & C. *ined.* Conn. Wright.

Phoma scabriuscula, B. & C. *ined.*
" Glæosporium, " "
Leptothyrium Ribis, Lib. Conn. Wright.
Depazea Castanæcola, Fr.
" smilacicola, Schw.
Sphæronema macrospora, B. & C. *ined.*
" subtile, Fr. J. L. Russell.
Diplodia vulgaris.
" Buxi, Fr.
" Corchori, Desm.
Hendersonia cespitosa, B. & C. *ined.*
Sphæropsis torulosa, B. & C. *ined.*
" collabens, B. & C. *ined.* D. Murray.
" Baptisiæ, B. & C. *ined.* D. Murray.
Septoria herbarum, B. & C. *ined.* D. Murray.
" Rhoidis, B. & C. *ined.* D. Murray.
" Polygonorum, Desm.
" Nabali, B. & C. *ined.*
Pestalozzia Guepini, Desm.
Melanconium varium, B. & C. *ined.*
Stilbospora magna, B. Conn. Wright.
" ovata, Pers. Bratto., Vt. J. L. Russell.
Endobotrya elegans, B. & C. *ined.* Maine.
Cytispora leucosperma. Conn. Wright.
" orthospora, B. & C. *ined.* J. L. Russell.
Næmaspora pruinosa, B. & C. *ined.* D. Murray.
Glæosporium crocosporum, B. & C. *ined.*
" cinctum, B. & C. *ined.* J. L. Russell.
Discella carbonacea, Bk. & Br. Maine, J. Blake.
Excipula strigosa, Fr. Conn. Wright.
Phragmotrichum Chailletii, Kunz. J. L. Russell.
Septonema spilomeum, Berk. Mass. Oakes.
Sporidesmium melanopum, B. & Br.
" concinnum, B.
Puccinea striola, Lk. J. L. Russell.
" Xanthii, Schw. D. Murray.
" Sorghi, Schw. Conn. Wright.
Uredo Leguminosarum, Desm. Conn. Wright.
" Hyperici, Schw. Conn. Wright.
" caricina, Schleich. " "
" Rosæ, DC. J. L. Russell.
" Phaseoli, Strauss. "
" Potentillarum, DC.
Cystopus candidus, Pers.
Ustilago Mayidis, Tul.
" Caricis, Schw.
Æcidium Violarum, DC. Maine, E. S. Morse.
" Epilobii, DC. J. L. Russell.

HYPHOMYCETES.

Isaria farinosa, Fr. D. Murray.
Tubercularia Pezizoidea, Schw.*
Sporocybe calicioides, Fr. J. L. Russell.
Cephalotrichum rufescens. J. L. Russell.
Pachnocybe subulata, B.
Cladosporium Fumago, Lk.
Mystrosporium Spraguei, B. & C. *ined.*
Dematium Muscorum, Lk. D. Murray.
Polythrincium Trifolii, Kunz. Conn. Wright.
Botrytis Viticola, B. & C. *ined.*
" lateritia, Bk.
Stachylidium diffusum, Fr.
Aspergillus glaucus, Lk.
Pennicillium crustaceum, Fr.
" epigæum, B. & C. *ined.* D. Murray.
Polyactis vulgaris, Nees. Conn. Wright.
Verticillium nanum, B. & C. *ined.* D. Murray.
Sepedonium cervinum. Fr. D. Murray.
Oidium moniloides, Lk. J. L. Russell.
Zygodesmus fuscus, Corda. D. Murray.
Myrothecium roridum, Tode. "

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* This is not a true Tubercularia, but is an anomalous and probably immature form of some higher order. It is found, however, all over the United States in precisely the same condition. Specimens from Lake Superior and Massachusetts do not differ at all.

ASCOMYCETES.

Morchella esculenta, Fr.
Helvella crispa, Scop.
“ monachella, Fr.
Peziza vesiculosa, Bull. D. Murray.
“ aurantia, Pers.
“ cochleata, Bull.
“ ollaris, Fr. Conn. Wright.
“ melaloma, A. & S. Conn. Wright.
“ fusca, Pers. Conn. Wright.
“ versiformis, “ “
“ albo-cincta, B. & C. *ined.* D. Murray.
“ diversicolor, Fr. J. L. Russell.
“ subiculata.
“ firma, Pers.
“ fructigena, Bull. Conn. Wright.
“ cyathoidea, Bull.
“ cupressina, Batsch. Conn. Wright.
“ carpinea, Pers. J. L. Russell.
“ herbarum, Pers. D. Murray.
“ discolor, Fr.
“ myceticola, B. & C. *ined.* Conn. Wright.
“ succosa, Fr. Conn. Wright.
“ rubella, Pers.
“ Exidiella, B. & C. *ined.* Conn. Wright.
Dermatea fasciculata, Fr.
Ascobolus Trifolii, Bernh.
Stictis rufa, B. & C. *ined.* J. L. Russell.
Vibrissea truncorum, A. & S.
Patellaria stygia, B. & C. *ined.* D. Murray.
“ applanata, B. & C. *ined.* Conn. Wright.
Tympanis rhabdospora, B. & C. *ined.*
“ Morsei, B. & C. *ined.* Maine, E. S. Morse.
“ conspersa, Fr. D. Murray.
Cenangium pithyum. “
“ Prunastri, Pers.
“ triangulare, Fr.
“ ferruginosum, Fr.
“ Pinastri, Fr.
“ Cerasi, Pers.
Rhytisma Solidaginis, Schw. Conn. Wright.
Rhytisma decolorans, Schw.
“ Vaccinii, Schw.
“ punctatum, Pers. J. L. Russell.
Hysterium fusiger, B. & C. *ined.*
“ culmigenum, Fr. Maine, E. S. Morse.
“ Pinastri, Schrod.
“ lineare, Fr. Conn. Wright.
Labrella Pomi, Mont. “ “
Hypocrea lateritia, Fr.
“ luteo-virens, Fr.
“ epigæa, B. & C. *ined.* D. Murray.
Xylaria corniformis, Fr.
Nectria aurantia, Pers. D. Murray.
“ cucurbitula, Tode.
“ coccinea, Pers.
Hypoxylon Clypeus, Schw.
“ glomiforme, B. & C. *ined.* Conn. Wright.
“ rubiginosum, Pers. J. L. Russell.
“ annulatum, Schw.
Sphæria undulata, Pers. J. L. Russell.
“ asterostoma, B. & C. *ined.*
“ stellulata, Fr.
“ Duriæi, Mont. Conn. Wright.
“ stictostoma, B. & C. *ined.* Conn. Wright.
“ semiimmersa, B. & C. *ined.* Conn. Wright.
“ fulvo-pruinata, B. Conn. Wright.
“ Murraii, B. & C. *ined.*
“ salicina, Pers. D. Murray.
“ herbarum, Fr.
“ culmifraga, Fr.
“ papilla, Schw. J. L. Russell.
“ salicella, Fr. “
“ elongata, Fr. “
“ Americana, B. & C. *ined.*
“ leucostoma, Pers.
“ Berberidis, Pers.
“ spina, Schw.
“ spurca, B. & C. *ined.* D. Murray.
“ Sartwellii, B. & C. *ined.*
“ coprophila, Fr. D. Murray.
“ vibriospora, B. & C. *ined.* Conn. Wright.

Sphæria discreta, Schw. Conn. Wright.
" myriocarpa, Fr.
" subiculata.
" cupularis, Pers. D. Murray.
" Demazierii, Berk. J. L. Russell.
" transversalis, Schw. D. Murray.
" Graminis, Pers. Conn. Wright.
" Coryli, Batsch.
" fimbriata, Pers. R. I. Mr. Metcalf.
" Lespedezæ, Schw.
" intercellularis, B. & C. *ined.* J. L. Russell.
" ulmea, Fr.
" punctiformis, Fr. J. L. Russell.
" Trifolii, Pers. Conn. Wright.
Capnodium Pini, B. & C. *ined.*
" elongatum, B. & Desm.
Microthyrium paradoxum.
Dothidea Anemones, Fr.
" flabella, B. & C.
" fructigena, Schw.
Erysiphe adunca, Schlech.
" guttata, Schlech. Conn. Wright.
Erysiphe communis, Schlecht.
" Syringæ, Schw.
Chætomium elatum, Kunze. J. L. Russell.

PHYSOMYCETES.

Ascophora Mucedo, Tode.
Mucor Mucedo, L.
" capitato-ramosus, Schw.
Ægerita candida, Pers.

SPURIOUS GENERA.

Erineum fagineum, Pers.
" roseum.
" luteolum, Pers.
Sclerotium semen. Tode.
" durum.
Centridium Cydoniæ. J. L. Russell.

NOTE. From my former list the following species should be erased:—

Cantharellus infundibuliformis.
Corticium Polygonium.
Geoglossum glabrum.
Peziza coprophila.

Mr. C. J. Sprague read the following paper, entitled,

THE BOTANY OF SORGHUM VULGARE.

Dr. Hayes has placed in my hands a suite of specimens of the *Sorgho sucré*, *Imphee*, *Dourrha*, and *Broom Corn*, for examination, at the request of Mr. H. S. Olcott, of Mount Vernon, Westchester Co., N. Y., who presents them to the Society. The points of interest which Mr. Olcott desires to have examined are these :—Whether these plants are or are not of the same species ; whether they will hybridize ; and whether they are likely to lose their peculiarities by careless planting and management. Some varieties possess more of the saccharine secretion than others. Is this excess a specific peculiarity, or the result of varied cultivation of the same species in different localities?

Will these peculiarities continue fixed, or will the varieties lose their distinctiveness when grown in company with one another?

The specimens consist of portions of the panicles of 18 varieties of Zulu Kaffir *Imphee*, grown in South Carolina, on the plantation of Gov. Hammond, from seeds ripened in France, and received from Mr. Leonard Wray. These specimens were gathered in a field, where they grew promiscuously, by Mr. Olcott himself, in company with Mr. Wray, who identified the varieties, and furnished the Kaffir names. There are four specimens of *Dourrha*, the seeds of which were received from France in the same package with the *Imphee*, and planted in the same field. Also, four specimens of *Dourrha*, *Broom Corn*, and their hybrids with *Sorgho sucré*, grown by Mr. Olcott in Westchester. I have added to these four specimens of *Imphee*, grown in the District of Columbia, and presented to the Society by Dr. Jackson, that the suite of specimens may be yet more full. My remarks upon these specimens will be confined to the fruit alone, as I have not seen the growing plants, and cannot, therefore, speak of the differences which may exist in their foliage and port.

Steudel, in his synopsis of the grasses, enumerates the following allied species of *Andropogon* growing in Asia and Africa:—*A. Sorghum*, Auct.; *A. rubens*, Willd.; *A. subglabrescens*, Steud.; *A. saccharatus*, L. (sub Holcus); *A. verticilliflorus*, Steud.; *A. niger*, Kunth; *A. cernuus*, Roxb.; *A. bicolor*, Roxb.; and he implies that most of these may be varieties of the *Andropogon Sorghum*. Besides these, is *A. Drummondii*, Nees, from New Orleans. These so-called species are, in all probability, founded on permanent varieties of the grass which has been grown for its grain and foliage for centuries in the East Indies and Africa. It was placed first in the genus *Holcus* by Linnæus, but has been separated from it and ranked in that of *Andropogon*. It is still kept there by some of the best botanists of the day; but by others it is placed in that of *Sorghum*, a genus separated from *Andropogon* mainly from its paniculate inflorescence and coriaceous glumes. The species named for Drummond by Nees is probably a form of the same plant which had established itself at New Orleans. An authentic specimen in Dr. Gray's herbarium does not appreciably differ from some of the varieties grown in South Carolina.

The thirty-one specimens laid before you are thought to represent four species, and many varieties. The seeds came from France, but the plants furnishing them originally came from widely separated localities. The differences which they exhibit are in the color, shape, and hairiness of the glumes; the color, shape, and prominence of the corn beyond the glumes; and the open or compact growth of the panicle. If these differences were constantly exhibited together,—if the difference of shape were always attended by a difference in color, and that color always accompanied by the same hairiness and exsertion of corn, there would be strong ground to establish specific differences. But such is not the case. The specimens, placed side by side, exhibit a complete gradation between the extremes of the series. Those which vary most in shape are similar in color. Those which differ in color are identical in shape. The hairiness and the degree of exsertion are coexistent with the extremes of shape and color. There are four which are especially interesting. Mr. Olcott grew Broom Corn and Dourrha in rows on each side of Sorgho sucré. The result was a plant partaking equally of the characteristics of the parents on each side. The eighteen varieties of Imphee, thought to be so distinct that different native names have been given them, exhibit every intermediate form imaginable. Some glumes are nearly white; some are specked with brown and black; some are all brown; others all black. Some have ovate pointed glumes of every hue; others have obtuse glumes with a broad, scarious point, or rounded glumes with no point, through the same series of color. The corns are either enclosed or exserted through the whole series, irrespective of color or form. Some of the varieties of Imphee present a peculiar appearance, from the persistence and prominence of the sterile spikelets; some, differing in no other respect, have these scarce visible; and some have them not at all. Color and hairiness are among the least reliable of botanical characters, and should have but little weight in plants so closely allied; and the other differences are exhibited almost as prominently in different panicles of the same acknowledged variety.

The question of the hybridity of species of plants has lately received close and careful attention. M. Charles Naudin has recently made a series of interesting experiments on the cultivated pumpkins and squashes. He has arrived at the conclusion, that nearly all those grown in our gardens may be referred to one single species. He has particularly examined the changes which artificial impregnations will produce. We often hear that cucurbitaceous plants should not be grown together, or they will injure each other. This gives rise to the question, whether the fruit of the same season can acquire another's peculiarities without first being grown from the seed, the result of such impregnation. Such has proved to be the case. The influence of the pollen on the fruit of the same year is such as to communicate to it the characteristics of the plant furnishing the pollen. But M. Naudin finds that true species, undoubtedly distinct, can scarce be made to hybridize, and that extensive and ready hybridation takes place only among varieties of one species. Dr. Gray has shown me recently an ear of corn exhibiting a hybridation more or less common. It was sweet corn, in which kernels of hard, smooth, yellow corn were irregularly distributed, contrasting with the white, wrinkled kernels of the sweet. Here the mere impregnation of the germ of white corn by the pollen of the yellow had been sufficient to convert those grains which it touched into perfect yellow corn.

The sports and varieties of corn have a strong bearing upon the question of the specific identity of these varieties of Sorghum. Though some botanists have made species out of the varieties of Indian corn, it is generally believed that these are all the results of cultivation on one species. One peculiarity of one form claims attention here. The plant has been found growing, apparently wild, with the grain entirely covered by the glumes, which project far beyond it. But it is said, that, after a little cultivation, these glumes disappear, or become so abbreviated as to allow the grain to be entirely uncovered, as in our garden growths. This same difference is to be seen in the varieties of Sorghum under consideration. The Dourrha most exhibits this abbreviation of glume and prominence of grain, and this variety is that which is known to have been longest under cultivation.

The question, then, arises, whether plants would so freely hybridize and exchange peculiarities, were they of different species. Does not this hybridity point to identity? We do not see other grasses, which grow broadcast in our fields, hybridizing naturally, and so perfectly as to become diversified in an inextricable series of graduated forms. The Poas, Panicums, and Festucas which abound in our fields and meadows do not interchange their specific peculiarities, but grow side by side and maintain their identity. But the Sorgho is no sooner placed side by side with Broom Corn and Dourrha, than the three hybridize, and produce an offspring combining the peculiarities of all.

The *Sorghum vulgare* has been cultivated for untold centuries as a forage plant and as food for animals and man. The question of its production of syrup and sugar is by no means a recent one. Experiments were made upon it more than half a century ago in Europe, and one of its names arose from the saccharine secretion of its culm. Its native country is unknown ; but it is supposed to originate in the same places where it has been so long cultivated. Its grains have been found in Egyptian sarcophagi ; and these are said to have produced plants identical with the modern Dourrha or Juari. After this long cultivation in all kinds of soil and climate, and under such varied treatment, it would be strange indeed if it did not exhibit a wide departure from its normal type If the Indian corn has become so astonishly changed in a shorter period of time, we may well understand that the Sorghum should wander into all the varieties upon which botanists have sought to found distinct species.

I am induced to believe, therefore, that *Broom Corn*, *Sorgho sucre*, *Imphee*, and *Dourrha*, are varieties of one primitive species, the *Andropogon Sorghum* of authors, or, allowing the genus Sorghum to stand, SORGHUM VULGARE.

The establishment of this fact will answer many of the questions which have been asked regarding its economic value. If they be one species, they will of course hybridize and exchange whatever properties they possess. The saccharine secretions of one variety will be diminished by hybridation with another not possessed of an equal amount. And the saccharine qualities peculiar to one may be lost by planting in a soil or climate differing from that which has brought them forth in unusual quantity. If their cultivation as a forage plant and a syrup or sugar-producing plant shall prove profitable, the use of the grain in the form of flour, as well as food for cattle and poultry, may considerably diminish the cost of cultivation. But the question is yet to be decided whether other crops may not prove far more profitable upon the same soil.

Dr. Charles Pickering remarked that he did not at all dissent from the views presented by Mr. Sprague in his paper. He was not prepared to say that the several varieties of Broom Corn, Dourrha, &c., are not one and the same species; he subsequently furnished the Secretary with the following summary of his observations of these plants:—

SORGHUM HALEPENSE. A coarse grass, with a sparse, few-flowered panicle; seen by Dr. Pickering only in the naturalized state, and never under cultivation. In the East Indies, he found it on Mindanao, seemingly wild, in great profusion in the openings of the forest. In Central Hindostan, the plant was growing in a similar manner, but was rare; as also, on the river flat of Upper Egypt, where he again met with it. The *S. Halepense* has been introduced into America; he had seen it growing along the irrigating canals at Callao, in Peru; and specimens, in collections of dried plants, from the Southwestern United States.

SORGHUM SACCHARATUM. Distinguished by its wide spreading panicle, with the branchlets subverticillate. Introduced into America, and long known to cultivators under the name of "Broom-corn." He did not happen to meet with this abroad.

SORGHUM VULGARE. Panicles always more or less coarctate. Seen by him only in the cultivated state, and never naturalized. In Hindostan, (the most eastern country in which he had seen it growing,) it varies in size, one kind being only about two feet high; while, in Egypt, he found it uniformly so tall and stout-stemmed, as to be mistaken in the distance for Indian Corn. The tall, slender-stemmed variety, exhibited to the Society as the Chinese *sugar-sorghum*, is new to him, and was not met with in any of the countries he had visited.

The sorghums are all tropical plants, introduced into Egypt and the countries around the Mediterranean from the southward, from some district not beyond the limits of the East Indian Archipelago. He saw nothing of them on the islands of the Pacific.

The President read a letter from Mr. William Edwards, of South Natick, Mass., upon the Cause of the Vibrations in water falling over dams.

Mr. Edwards says that his attention was called to this subject by the report of the Proceedings of the American Association for the Advancement of Science at Montreal, and by recent discussions at the Boston Society of Natural History. The dam across Charles River in the village of South Natick is nine feet high and two hundred feet long, and, at certain stages of the water, the vibrations are so powerful as to agitate bodies three quarters of a mile distant.

During the month of December, the water being at its most favorable point for the production of vibratory movement, in connection with his brother, a series of experiments upon the subject was undertaken by him. By erecting a flashboard, three feet in length, on the top of the dam, the water was shut off, and a dry entrance obtained behind the falling sheet. Ample room was found to walk back and forth. At the place of entrance, the flame of a lamp was unagitated, a fact unexpected by them, as they had favored the hypothesis of Prof. Snell, and had supposed that air sufficient to cause the vibrations would have found an exit at this opening.

Twenty-five or thirty feet from the entrance, the flame was slightly agitated simultaneously with the vibratory motions. A falling feather descended as quietly as in a close room. The discharge of a pistol produced no perceptible effect upon the water, although the report nearly stunned them. It having been suggested that the vibrations are produced at the bottom of the sheet and continued upward to the top of the dam, they endeavored to produce such an effect by placing obstructions at various points, but without success. Whilst holding the ends of the fingers in the current, two or three inches from the corner of the timber over which the water breaks, it was evident that the water passed the fingers in ridges, apparently one half or three quarters of an inch apart. By following with the eye, in their descent, these ridges or vibrations, it was found that the interval between them increased, with the velocity of the water, to the extent of fourteen inches. An aperture in the water, made by the passage of a stone of the size of a hen's egg, at the top of the fall, increased in size just in proportion to the increasing distance of the vibrations, retaining its circular form, and finally expanded to fourteen inches in diameter. Upon the top of the dam they could see distinctly through the current to the edge of the timber over which the water breaks, and they found that *the water at this point acquires a tremulous motion, giving origin to the ridges or vibrations* alluded to above, which here follow each other at intervals not exceeding one quarter of an inch. The sheet of water at the top of the dam is six inches in thickness; at the bottom two and a half inches. The ridges are evident on the inside the whole length of the fall, but upon the outside they do not make their appearance for the space of ten or twelve inches. They increase in size relatively with the distance.

Mr. John Green presented several specimens of Fishes from Surinam. They were the female *Anableps Gronovii*, with the ovary containing the young exposed to view; the *Aspredo levis*, with its eggs adherent to its abdomen; and a species of Bagre which carries its eggs in its mouth, some of the young fish being seen just hatched from the egg. The eggs in this specimen chanced to be of two distinct species, showing that the fish may get and carry in its mouth the eggs of another. He knew of six species which carry the eggs in the mouth.

The President said he had examined several specimens of Bagre before finding one with the eggs of a different species in its mouth. The young are found alive, either within the envelopes of the eggs or already hatched, even when the fish has been dead some length of time. The number of eggs in the ovaries is small, not greater than can be carried in the mouth, and are in three different stages of development, so that they are not all discharged at the same time.

Dr. Charles Pickering alluded to the indestructible nature of the eggs of some fish; they have been known to hatch after traversing the intestinal canal of a bird.

Dr. A. A. Gould observed, that at a recent meeting of the

Horticultural Society, a discussion arose upon a question of petitioning the Legislature to repeal the law concerning the destruction of robins and other birds, the injury to fruit being so extensive from their abundance in the neighborhood of Boston. He hoped the present law, preventing the destruction of birds, would remain in force, as the benefit derived from them, in the consumption of insects injurious to vegetation, far surpasses the value of the fruit lost.

Mr. T. T. Bouvé remarked that, in Hingham and its neighborhood, he had noticed that the robins' nests are invaded by crows and about half of the young destroyed. The crow exhibits considerable instinct in selecting a proper time for the depredation.

Rev. Theodore Parker inquired if it had been noticed that the crow mates in families of three, generally one male and two females, an arrangement by which the duties of obtaining food and watching its young are better performed than by pairs. This he had observed, but could find no notice of it in works on Ornithology.

The President stated that he had known a Hornet's Nest, built under the portico of a house in Roxbury, to be occupied three successive years,—a fact contrary to what is commonly supposed.

The Corresponding Secretary read the following letters recently received, viz:—

From Russell Loring, Esq., and Dr. J. B. Toldervy, in acknowledgment of their election as Members; the Elliott Society of Natural History, Charleston, S. C.; Royal Society of Edinburgh, December 1, 1856; the Naturhistorischer Verein at Bonn, April 20, 1857; the Société des Sciences Naturelles de Neuchatel, May 7, 1857; acknowledging the receipt of the Society's publications; the Naturwissenschaftlicher Verein, Hamburg, Oct. 4, 1856; the Naturhistorischer Verein, Bonn, April 20, 1857; Verein für Naturkunde, Stuttgart, May 24, 1857, presenting their various publications; from D. Washburn, Esq., Corresponding Secretary of the Pottsville Scientific Association, presenting a copy of a work entitled "Studies in Organic Morphology."

Messrs. L. B. Stone and P. C. Hill were elected Resident Members.

January 20, 1858.

The President in the Chair.

Mr. John Green exhibited a number of photographs, taken by the collodion process, of microscopic objects, many of which had been very highly magnified. In connection with Mr. Albert Gould of the Scientific School, he had been experimenting upon the subject, and had succeeded in obtaining very fine and accurate representations of some of the fossil diatomaceæ, crystals, sections of bone, and various vegetable tissues. The most transparent objects, such as fossil Naviculæ, were well taken, even when magnified eight hundred linear diameters.

Mr. C. H. Hitchcock exhibited a diagram of a geological section from Greenfield to Charlemont, Mass., and gave the following explanation of it:—

This section was measured in October, 1857. The design of it is to show the amount of erosion since the strata were brought into their present position.

I will enumerate the rocks in order, going from east to west, beginning at Greenfield. At Greenfield we find the Connecticut River Sandstone dipping 40 degrees E. Leaving the valley we strike the Calcareomica-slate in Shelburne, having a dip of 67 degrees E. This rock consists of micaceous slates and schists interstratified with bluish-gray silicious limestone. The dip gradually increases to 38 degrees E. at two and a third miles from the commencement of the rock; when, upon East Mountain, we find a beautiful mica-slate which cleaves into large tables, and is generally destitute of limestone. The dip of this is 40 degrees E., and it extends one and one third miles. Then, just below the top of East Mountain, upon the west side, there is about fifty feet thickness of hornblende slate, of which the dip is 28 degrees E. Passing into the valley of the Deerfield River, gneiss is found, becoming gradually nearly horizontal. Between this rock and the hornblende slate above, it is hard to draw the line. Most of the gneiss has hornblendic layers interstratified with it sparingly; but at the top of the gneiss the hornblende predominates; the rock being in some places nothing but a heavy, unctuous, shining mass of hornblende crystals. West of Shelburne Falls the gneiss begins to dip to the west. The extent of the gneiss is four and one third miles, mostly in a deep valley.

At East Charlemont the hornblende slate is found above the gneiss, corresponding in character and thickness to the same rock in Shelburne. Then follows the beautiful mica-slate, sparingly interstratified with limestone, and lastly the calcareomica-slate, corresponding to the rock at the east end of the section. Here, at the end of the section in Charlemont centre, the strata are perpendicular, running north and south, and stand side by side with talcose slate.

The Deerfield River makes a bend just above Shelburne Falls, so that the section crosses the river twice, and continues for two or three miles further in the valley. Had a section been measured across the river at Shelburne Falls village at right angles to the stream, it would have exhibited a mountain, west of the river, possessing all the characters of East Mountain in a reverse order. Thus we find an anticlinal axis, with the same strata upon the opposite sides of the ridge at their proper distances. The inference is that the strata were once continuous, and that the material has been denuded. A measurement upon the protracted section gives 3,350 feet, or three fifths of a mile, as the height above the present level of the former strata. This is taken from the lowest level upon the section. As we go east or west from this central point, the surface rises; consequently the thickness of the denuded strata constantly diminishes in these directions. The denuded surface is eleven miles wide.

From the bend in Deerfield River above Shelburne Falls the stream continues westward in a deep valley for twenty miles, to Hoosac mountain, before turning northwards. This valley has probably been excavated in like manner; but no exact measurement can be made of the amount of erosion, because the river crosses perpendicular strata. A line drawn from the summits on either side of the valley to each other would give large results; but they would not be equal to the truth.

Let us now look at the first described erosion in another light. The gneiss rock at the bottom is exposed over an oval area about three miles by two. If ten observers should start from the centre of the oval, and travel in as many different radiating directions, they would all see the same succession of rocks, and in the same order. The dip is quaquaversal, gradually returning to an anticlinal axis at a few miles distance north and south. Hence there has been a cap denuded, three fifths of a mile thick. Doubtless, all along this anticlinal axis, wherever the upper rocks have been removed, the gneiss beneath will be discovered. It corresponds to the gneiss and hornblende slate of eastern Hampshire and western Worcester counties, and would seem thus to lie below the Metamorphosed Silurian rocks. If so, it should be included among the Hypozoic rocks.

Sections similar to the foregoing have been measured and described by English geologists. Not being aware of any similar work in our own country, I have described this section in hope of drawing attention to the subject, and thus insure descriptions of sections far more grand and interesting. I can vouch, on the part of the Vermont survey, for a careful attention to this subject.

Prof. W. B. Rogers made some remarks upon the section exhibited by Mr. Hitchcock, which he characterized as a good example, in a highly metamorphic region, of the prevailing structure of the Appalachian chain. He described the gradation from closely folded curves to normal and flattened arches, which is so beautifully displayed throughout this belt from Pennsylvania to middle Alabama, and referred to the presence of like features in the northern extension of the belt, as well as in the zone of highly altered rocks adjoining it on the southeast.

With respect to the break in the middle of the section presenting the character of an anticlinal valley, he remarked that this central interruption was the usual feature in the principal anticlinals of the Appalachian chain. In numerous instances, some of which were cited, the anticlinal wave, where it has attained its greatest magnitude, has been carved out longitudinally along the axis, forming a narrow valley, many miles in length. In this are seen the lowest rocks of the range, dipping in opposite directions so as to pass beneath the hills by which the valley is walled in. These bounding hills, formed of higher strata arranged in corresponding order, are but lateral remnants of what was once a broad and lofty ridge, composed of successive formations continuously arched from side to side, but from which the violent denuding actions of a former period have removed the higher and central parts. The proof of this is well shown at either end of the valley, where the strata of the opposite hills are seen to come together, layer after layer, in the ascending order, until the valley is entirely closed up, after which the anticlinal is continued in a single unbroken ridge of arching strata.

Prof. William B. Rogers called the attention of the Society to the curious phenomena connected with the sonorous action of jets of burning gas, which have lately been observed by Count Schaffgotsch and Prof. Tyndal.

The production of a musical sound by a small flame of hydrogen gas, burning within a tube, has long been one of the most familiar of lecture-room experiments. Prof. Faraday, in one of his earliest investigations, showed that this musical effect was not confined to hydrogen, but could be produced with flames of carbonic oxide, common illuminating gas, and several other gases and vapors. He was, moreover, the first to give a philosophical theory of the sound, by showing that in the conditions of the experiment, the flame resolved itself into a series of little explosions, which, succeeding each other at very small and equal intervals of time, gave rise to regular and therefore musical vibrations in the tube.

In the recent experiments the further fact has been observed, that the flame, both when singing and when silent in the tube, is strongly acted on by *external sounds*, having a certain musical relation to the tone of the pipe or flame. These effects, Prof. Rogers illustrated by a jet of coal gas, burned in glass tubes of different lengths, and a short organ pipe, for producing the external sounds.

In studying experimentally the conditions under which these sounds are produced, Prof. Rogers had lately ascertained that the usual absence of the sonorous effect in the case of lamps or candles burned under the same conditions as the gas, is not due, as might be supposed, to a mechanical interference of the wick with the vibrating motion. He found that wicks of cotton thread and of asbestus, introduced into a jet pipe of gas, even so as to project far into the flame, did not prevent its singing, although they impaired the purity of the musical tone. The difficulty of obtaining continuous musical sounds from a common flame with a wick, must rather be ascribed to the nature of the combustible matter, which, requiring a very large supply of air to produce the explosions, is liable to be extinguished before the musical sound is developed.

To obtain an *Ether flame* suitable for these experiments, Prof. Rogers uses a glass tube about eight inches long and one quarter of an inch in diameter, open below and drawn somewhat bluntly to a point, with a small aperture at the top; some loose cotton twine or thread of Asbestus being introduced so as to terminate at or very near the pointed opening, the tube is half filled with sulphuric ether; the larger end is closed with a tight cork, and the little ether candle is fixed vertically in the centre of a wooden block. On applying a light to the apex, the ethereal vapor burns in a steady bluish jet, which with proper tubes enables us readily to repeat all the experiments on the singing and the silent flame. This simple apparatus acts freely at ordinary temperatures, and may be used from time to time for several days without replenishing.

In regard to the agency of the flame in giving rise to the musical tone, Prof. Rogers thought it might be compared to that of the reed of various wind instruments, the vibration of which, by giving motion to the column of air in the pipe, causes the sound to begin, although the vibrating column, by its reaction on the reed, controls more or less the rate of its oscillations, and determines the pitch of the sound produced. A similar reaction between the aërial column and the flame quickly establishes a synchronous motion of the two, corresponding to the fundamental note, or to one of the natural harmonics of the tube.

Dr. S. Kneeland, Jr., through the kindness of D. T. Curtis, Esq., exhibited some fine specimens of the Chinese Yam, (Dioscorea batatos,) raised in Taunton, Mass., by A. Andros, Esq. He remarked that they were the finest specimens ever seen here, being from eighteen to twenty-four inches in length, and from two to three inches in thickness at the lower end, whence they gradually taper upwards. They are cultivated like the sweet potato. The tubers are cut into pieces of about one inch in length, and are planted, about the first of June, in drills about eight inches apart. They prefer a light, dry, warm, and sandy soil, growing well at Nantucket. They are very hardy, and such as are not wanted for use in the autumn, may be allowed to remain in the ground all winter, being well preserved in that condition like a parsnip. If not dug up, they will grow again the succeeding year. They may be cooked in the same manner as the sweet potato.

Mr. C. K. Dillaway, in behalf of the Publishing Committee, announced the publication of the fourth and last number of the Sixth Volume of the Journal. This number contains descriptions of New Species of Fossil Plants from the coal-fields of Pennsylvania, of Anableps Gronovii, and of the Crustacea, Echinodermata, and Fishes collected in California by Mr. E. Samuels. The Publishing Committee desire to see the subscription for the Journal increased, and would inform those interested that the next number will commence a new volume. Upon motion of Mr. Sprague, it was voted to refer to the Council the subject of enlarging the list of subscribers to the Journal.

Rev. Joshua A. Swan, of Kennebunk, Maine, was elected a Corresponding Member, and Messrs. Chas. T. Carney and W. W. Baker were elected Resident Members.

February 3, 1858.

The President in the Chair.

The President gave a brief account of a dissection of a human fœtus in the third week after conception, pointing out some of the transitionary forms which are to be seen only for a very short time, and comparing the various parts with the corresponding parts of other animals. He alluded to the position of the eyes, which are very far upon the side of the head, and widely separated from each other, corresponding to the permanent position of those organs in cetaceans; to the position and form of the nostrils, which are far apart, and externally connected with the cavity of the mouth, corresponding to the condition of the nostrils in some of the American monkeys; to the branchial arches and fissures, opening into the cavity of the œsophagus, and remaining a greater length of time in some animals than in others, and persistent in fishes, where they become the gills. He also pointed out the position and earliest condition of the arms and legs, remarking, that in all instances, even before any pressure can be exerted upon them, both extremities assume the angular form which persists in quadrupeds. The lower extremities are not developed at the extreme termination of the trunk; consequently the spinal canal projects and gives the appearance of a tail, until the growth of the legs is more advanced. The President also explained in what manner an arrest of development would produce some of the common malformations, such as hare-lip and fissured palate, and instanced a case of fissure of the neck, described by Hyrtl, where there was an opening from the external surface into the gullet, one of the branchial fissures of the embryo having remained unclosed.

Dr. C. T. Jackson exhibited a sample of Crystallized Sugar, which he said was *Cane Sugar*, manufactured from the Chinese Sugar Cane, by Mr. Joseph S. Lovering, of Philadelphia, and read extracts from a pamphlet upon the subject, giving some of the details in the processes employed and results obtained.

Dr. A. A. Hayes said that neither the crystalline forms nor the action of the polariscope are to be relied upon in distinguishing the varieties of sugar. He considered the crystalline forms of the Sorghum sugars, and likewise that of honey sugar to be identical. He was not aware that glucose crystallized in the cubic system. The chemical properties of the sugars, he believed to be the only distinct proof of the several varieties.

Dr. Jackson replied that it was distinctly stated, in several chemical works of authority, that cane sugar and glucose crystallize in different systems.

Dr. C. T. Jackson presented, in the name of T. Glover, Esq., a specimen of a Parasitic Plant growing upon the body of a common Fly found upon a pear-tree. Mr. C. J. Sprague said that it was an immature specimen of one of the species of *Cordiceps*.

Dr. Jackson presented samples of the Earth Almond of Spain, *Cyperus esculentus*, which were raised in Washington. They contain a large amount of starch, and are good food for swine, turkeys, and other domestic animals. They grow well in sandy soils.

Dr. Jackson also exhibited a Chinese Yam, *Dioscorea batatas*. It contains a peculiar ropy mucilage, which is neither arabine nor dextrine; it dissolves in water and starch precipitates it.. The specimen contained 80.52 per cent. of water. The amount of ligneous fibre is quite small, differing, in this respect, from the West Indian Yam.

Mr. Charles Stodder read a communication from Mr.

Wm. Edwards, of Natick, upon the Vibrations caused by Water falling over Dams.

Mr. Edwards writes that, at the request of Mr. Stodder, he counted, as nearly as possible, the number of vibrations, at some distance from the dam, and the number of the waves, and, although their rapidity made it very difficult to count them, ranging as they did from 280 to 325 per minute, he found that they coincided. This fact was rendered still more conclusive by assuming a position at one end of the dam where the vibrations could be seen, heard, and felt, all at the same time. Every portion of the timber over which the water flows, produces vibrations of greater or less distinctness, and, occasionally, the waves of a certain portion of the dam fall in the wave intervals of the other end of the dam, and then the vibrations of the earth cease. Standing in front of the dam, and placing a pole on the bed of the river, directly under the fall, the pole was violently agitated, although there are two feet of back-water through which the water must pass before it reaches the pole. In the falling sheet, the wavelets are concavo-convex, and not double convex, that is, the internal surface corresponding with an external convexity is concave.

Prof. W. B. Rogers remarked, that the wave-like divisions of the descending sheet of water were probably referable to the same general law which has been shown by Savart and Plateau to obtain in the case of a stream flowing from an aperture in the bottom or side of a vessel. These philosophers have proved that, at a certain distance from the point of discharge, the stream, although seemingly continuous, is in reality divided into separate parts; and Plateau explains this subdivision by the preponderance of transverse cohesive forces in the column, when its length exceeds its thickness by more than a determinate amount. In this case the sides of the stream are drawn together at intervals, and the mass is thus broken up into separate sections, which, by further cohesive action, are moulded into drops. Thus every such stream, at some distance below the aperture, loses its straight outline, and assumes the form of a series of enlargements and contractions, which, at a still greater distance, become visible as a succession of drops.

It is interesting to remark that a regular system of vibrations occurs in the streams thus affected by wave-like subdivisions, enabling them to produce strong musical tones, when suffered to strike upon an elastic surface, and to communicate similar musical vibrations even to the reservoir itself. In this action we discern somewhat analogous conditions to those of the powerful vibratory movements attending the descent of large masses of water over dams.

Prof. William B. Rogers stated the results of further experiments on Sonorous Flames which he had made since the last meeting of the society.

He had previously attempted, but without a satisfactory result, to obtain the musical vibrations with flames of alcohol and other liquids burned directly from a wick. More recently, by employing hollow circular wicks and using tubes but slightly exceeding them in diameter, he had been able to produce these musical effects with the flames of sulphuric ether, common alcohol, and the mixture of the latter with spirits of turpentine, which is known as burning fluid. By using an iron tube at a high temperature he had obtained, though less perfectly, a similar result with the flame of spermaceti oil.

As the effect in these experiments depends on the access to the flame of a current of air of definite amount and velocity, and in a proper direction, it is necessary to adjust the diameter of the wick and size of the flame to the dimensions of the tube employed, and to hold the tube with its lower edge a little below that of the wick. The flame will then be seen to contract, to lose much of its brilliancy, and, after more or less of a rattling sound, to give forth a musical tone, which, with a little care, may be rendered quite smooth and continuous.

These results are readily obtained with the flame of the small circular wick lamp now in use for burning the mixture of alcohol and turpentine. In this form of lamp the wick-tubes rise about two inches above the reservoir, and an internal movable tube is provided, which, being raised or lowered, serves to vary the depth of the wick and to adjust the flame with great nicety. The body of the lamp should be removed from its pedestal and placed on a ring support to secure a free current of air upward through the central wick-tube.

A simple way of making the experiment with an alcohol wick is to inclose, between two glass tubes, a strip of cotton cloth or thick paper, so that it may project a little beyond the upper end of the tubes. When charged with alcohol and lighted, it will furnish a hollow circular flame well suited for the temporary production of the musical effect.

These results favor the conclusion that *flames of every kind are capable of exciting sonorous vibrations,* provided the air and combustible vapors are brought together in such proportions as to form more or less of an explosive mixture, and they therefore confirm the explanation of Faraday, which refers the musical sounds produced in such cases to a rapid and uniform succession of small explosions.

Dr. Henry Bryant presented a specimen of Iron Ore from the State of New York, exhibiting throughout a granular or oölitic structure.

This ore Prof. Rogers described as characteristic of the Clinton or surgent rocks, and as found in unvarying geological relations throughout the Appalachian belt from New York to Alabama, as well as at some points in the northwestern States where these rocks are developed. It usually presents itself in the form of thin beds or plates, rarely more than two in number with an interval of from 10 to 30 feet of calcareous shales. The adjoining strata are, for the most part, slates and shales, charged with sulphuret of iron, and bands of shaly and slaty limestone often crowded with fossils. The ore itself is made up of small roundish flattened granules of a bright red color and rather soft texture, and contains, interspersed in the mass, numerous casts of shells, encrinal stems, and other characteristic fossils.

It has been observed that these strata of iron ore, when followed to a considerable depth below the surface, become more and more calcareous, and at length, in many cases, pass into a ferruginous limestone and even into a calcareous mass entirely destitute of oxide of iron. As the continuity of the stratum of ore with that of the limestone has been clearly proved, we are led to conclude that the oxide of iron has been introduced at and near the surface, by some chemical action, which has at the same time removed the carbonate of lime originally forming the material of the stratum. In looking for an agent adequate to this effect, we naturally refer to the sulphate of iron and free sulphuric acid, developed in the adjoining pyritous shales, which, brought by infiltration into contact with the calcareous rock would at the same time dissolve the lime and deposit the oxide of iron in its place.

Dr. C. T. Jackson observed that he had found, in the oölitic ore from Wisconsin, that the nucleus of the egg was a grain of sand. In chemical precipitates, a soft solid in a pasty condition is frequently found to pass into a granular state, especially if particles of sand are present, producing imperfect crystalline forms around a nucleus.

Messrs. Kilby Page and Charles W. Lovett, Jr., were elected Resident Members, and Messrs. Bernard A. Hoopes, of Houghton, Michigan, and H. Davis, of Elgin, Kane Co., Illinois, were elected Corresponding Members.

DEPARTMENT OF MICROSCOPY.

Dr. S. Kneeland, Jr., exhibited the spine of an Echinoderm, prepared by Mr. Samuels.

A collection of marine animals and plants, presented by Mr. N. E. Atwood at the first January meeting, was referred to Dr. Bacon and the Secretary for examination.

February 17, 1858.

The President in the Chair.

Dr. C. T. Jackson stated that he had chemically tested the sugar made from the Chinese Sugar Cane which he exhibited at the last meeting. After boiling it, for a great length of time, with the tartrate of copper and potash test, there was no reduction of the oxide of copper. Chemical evidence, therefore, showed it to be Cane Sugar, and not Glucose.

Dr. Jackson also exhibited a Sugar which he had obtained from the Spanish Earth Almond, *Cyperus esculentus.*

Mr. John Green stated that he had detected unequivocal signs of *Strychnine* in the liver of a skunk which was said to have been killed by this poison. The process by which it was found is that proposed by Flandin, which Mr. G. had described in the Boston Medical and Surgical Journal, June, 1855. As is well known, there is great difficulty in detecting minute quantities of vegetable poisons in the animal body, and the theory has been advanced that they are destroyed before reaching the liver.

Dr. A. A. Hayes remarked that the communication of Mr. Green had interested him, and he deemed it highly important, on account of the positive fact of the detection of strychnia, after a moderate dose had caused death. From personal experience, he was led to add his testimony to the efficiency and simplicity of the method of M. Ch. Flandin, for detecting the poisonous alkaloids in the tissues of the organs; as well as in the contents of the stomach.

In some trials, in the way of testing this method, Dr. Hayes stated, that using simple extract of opium, and pursuing morphia and meconic acid, he had been led to the conclusion that the excess of lime might react on the alkaloids, at the temperature of the water-bath, and thus reduce the amount of any alkaloid it would be possible to detect. In some cases, too, the dry mass containing the alkaloid with a large excess of lime, even in the state of fine powder, was slowly acted on by alcohol:—a great abundance of lime combinations with fatty acids being present. He had found it advantageous, especially when operating on partially digested food in stomach contents, to add a small portion of chloride of calcium solution, which has the power of dissolving lime in excess, when concentrated, (Ca. Cl., CaO.) and thus, without diminishing its activity in breaking up protein compounds, allows the dry matter subjected to alcohol, or other solvents of alkaloids, to remain permeable. When baryta or lime is subsequently employed to develop the alkaloid, either with or without ammonia salts, the chloride of calcium does not interfere, and very pure alcoholic or ethereal solutions, can at once be obtained.

He added, that he wished to express his accordance with the opinion of Mr. Green, that the chemical experiments should be so conducted in the search after poison, which had caused death, as to eliminate from the tissues that portion which had entered them, as being distinct in its effects, from the remainder found in the stomach, or intestines, uncombined with protein compounds. In cases of poisoning by corrosive poisons, the parts destroyed or altered are easily observed, and the results of many experiments had led him to form the opinion, that the organic poisons, in their actions, leave traces only little less strongly marked.

Dr. Samuel Cabot, Jr., stated that a specimen of the Ruddy Duck (*Erismatura Dominica*) of South America, as is supposed, had been shot in a little bay upon the northeast shore of Lake Champlain. It had never before been seen north of Jamaica. The specimen is in the possession of Mr. Henry D. Morse, who intends to present it to the Society.

Dr. David F. Weinland read the following paper entitled—

THE PLAN ADOPTED BY NATURE FOR THE PRESERVATION OF THE VARIOUS SPECIES OF HELMINTHS, (Parasitic Worms.)

It has been determined by the Helminthological investigations of the past twenty years, that all Helminths have reproductive organs, and produce eggs; and that all those which have been described as wanting these organs, and in whose cases the theory of spontaneous generation has been applied, are the undeveloped stages of other well known Helminths which have reproductive organs. For instance, the whole order of Hydatids (*Cystica* of Rudolphi) are found to be larvæ of tapeworms, and the immense number of Helminths, which are found encysted in tissues in a kind of chrysalis state, are all in the early stage of development of a more perfect animal.

The eggs, therefore, are the only means which nature makes use of in the preservation of Helminths. As all animals are not the proper habitat of every species of Helminth, but, on the contrary, as every species has provided for its nidus either one or a few species of animals, the determination of the species adapted for the development of each kind of worm is of great interest and importance.

The number of eggs produced by each individual Helminth is immense. They are to be estimated by thousands; and, in those species where the development is more complicated through change of habitat, the calculation is to be made by tens of thousands and millions. According to an average estimate, made from the number of human tapeworms in a certain district, and from the number of eggs they produce, we should judge that, from a million of eggs, scarcely one tapeworm reaches its full development. More than half of a million of eggs may perish before the embryo is hatched: but, provided every individual worm produces a million of eggs, the existence of the species is preserved, if only one egg out of a million becomes fully developed. The loss of this great amount of germs seems, at first sight, to be extravagant; yet, here as everywhere, nature studies the strictest economy, that is, effects with the smallest possible means the greatest possible results; and exhibits the most profound and accurate calculation of chances,—a profundity and accuracy extremely difficult to be imagined when the innumerably varying conditions are taken into account. The number of individuals living at a given time may vary; but, for any considerable length of time, there is no variance; otherwise there would be a disturbance in the numerical relation of animals, and consequently in the order, beauty, and variety of nature. For if, instead of one, three or four out of the million eggs were to arrive at maturity, the number of Helminths would be three or four times as many as at present, and, in succeeding generations, hundreds and thousands of times as many. In those orders of Helminths, where the development is the most complicated, as in Tapeworms and Suckworms, the individuals are hermaphrodites and capable of propagation by themselves, consequently rendering unnecessary a union of the sexes, and thus counterbalancing any loss occasioned by the conditions of development.

The eggs of Helminths are exceedingly minute, being scarcely visible to the naked eye. They are so light as to readily float in water, or to be transported by the slightest movement of the air. They may likewise be disseminated in numerous ways, their hard and horny shells and their minuteness serving to protect them from injury. The eggs of tapeworms, as far as is known, and those of most spindleworms are destined to be swallowed with the food or drink of certain animals, in the intestine of which the embryo hatches. The embryos of some spindleworms and probably those of all suckworms and hairworms can hatch only in water, where the eggs must arrive by chance, as in suckworms, or be deposited by the mother, as in hairworms. It is unknown, as yet, what becomes of the eggs of hookworms. But the embryos of tapeworms, suckworms, and hookworms, and, as it appears, also those of many spindleworms, reach, in the first animal into which they enter, only a limited degree of development, and never the perfect stage; that being achieved only in the intestine of another entirely different carnivorous or insectivorous animal, of which the first was the predestined food. In this, likewise, we see the number of Helminths based upon chance, those embryos which are necessarily lost in the first animal when it has not been swallowed by another animal proper to perfect them, being taken into the calculation.

Most Helminths perfecting their development in the intestine, their eggs reach the outer world readily; but it is difficult to say how the eggs of certain species, which live in organs not communicating with the external world, like blood-vessels, can make their way out. Still more difficult of explanation is the case of the viviparous Helminths. In many species of spindleworms, for instance, the common Oxyuris vermicularis of the human rectum, the young is born without any shell to protect it in its wanderings, and is therefore extremely exposed to the danger of being dried up or otherwise destroyed.

Mr. Jerome G. Kidder was elected a Resident Member.

March 3, 1858.

S. Durkee, M. D., in the Chair.

Mr. John Green, Jr., stated that, when he made his remarks at the last meeting, upon the detection of strychnine and other alkaloids in cases of poisoning, he had been unable to find any record of their detection in the *tissues* of the body. He had subsequently, however, found, in the Journal Medicale for December, 1856, an account of toxicological experiments upon the bodies of various animals which had been poisoned with minute doses of strychnine, in the *tissues* of which that substance had been found. It was recognized after the lapse of months, and even of years, and, in one instance, was found in the bones, and in the material of a wooden box in which an animal had been buried.

Mr. Green also referred to a process for the detection of alkaloids, in which all organic matters are destroyed by strong sulphuric acid, and he remarked that strychnine must be a far more stable body than it has heretofore been considered.

Dr. David F. Weinland made some remarks upon the method of locomotion in Lophobranchious Fishes.

It is generally supposed that these fishes move with the tail, whilst the fins of the other parts of the body merely preserve the equilibrium. Dr. Weinland, when in Hayti, noticed the Syngnathus advancing continuously in a curved line without any motion of its body. Upon looking for the cause of locomotion, he found the dorsal fin making short and quick vibrations, resembling those of the screw of a steam-propeller, and the caudal fin likewise exhibiting the same movement. It is therefore shown that the tail fin is not the sole organ of locomotion in Syngnathus.

In Syngnathus the eyes are capable of motion through the arc of an angle of ninety degrees.

Prof. William B. Rogers gave an account of some new experiments on sonorous flames made by him since the last meeting, which, in a very simple way, illustrate the origin and some of the conditions of their musical vibrations.

(1.) When a jet of burning coal-gas is introduced into the resonant tube in a position in which it does not sing spontaneously, we may cause it to commence its musical performance by simply vibrating the jet pipe rapidly from side to side. In this experiment the pipe should be covered with soft buckskin for two or three inches near its upper end, to prevent the sharp jarring sound caused by its striking the glass. This movement of the jet is so efficient in bringing on the sonorous state, that it will compel the flame to sing, even in a tube in which it would not do so spontaneously in any position in which we could place it. Indeed, it will often excite the musical vibrations in cases where, from the unsuitable proportions between the tube and flame, the external sounds used in Schaffgotsch's and Tyndal's experiment entirely fail to bring on the sonorous state.

Although the singing is induced more promptly when we allow the jet pipe in its vibrations to strike the sides of the tube, this action is not at all necessary; for we obtain the same result when the pipe is merely shaken to and fro within such limits as to prevent its touching the glass. The effect here described can hardly fail, when first observed, to excite surprise, especially if from previous trials we have found that the flame refuses either to sing spontaneously or under the action of external sound.

So far as the impulse of the jet pipe against the sides of the tube is influential in exciting the sound, we must ascribe its action to the feeble musical resonance produced by it within the tube, which, although composed of several sounds, may always be observed to include the fundamental note of the tube. This action is therefore like that of a unison note sounded by the voice or an external instrument, or that of any other mechanical agency giving rise to a vibration of the included column of air. But the other and far more remarkable effect, the excitement of the musical condition in the flame by simply moving it to and fro without striking the tube, cannot be thus explained, since the gentle impulse given to the air by the vibrating pipe produces no audible effect and would seem quite inadequate to excite in the column any but the very feeblest vibration. Admitting, however, that these extremely faint vibrations of the air may contribute somewhat to the result, it can hardly be doubted that the main influence by which the movement of the jet produces the effect in question is by causing so rapid a mixture of the adjoining air with the gas that the latter, before being inflamed, is brought into a condition to produce those small explosions which by their quick succession give origin to the sound. The effect of motion in bringing about this explosive condition of the flame is well exemplified by the following experiment:—

(2.) Fastening a jet pipe some ten inches in length into the end of the flexible tube through which the gas is supplied and holding it erect by a point a little below the insertion so that we can readily cause it to vibrate, we ignite the gas and adjust it to form a slender flame about an inch long. If now the flame be moved from side to side at a moderately rapid rate, it will assume according to a well-known visual law the appearance of a continuous arch of whitish light retaining at the extremities the whole height of the stationary flame but growing narrower from either side towards the middle. In these conditions the flame is *entirely noiseless.* As we gradually increase the speed of the vibrations the arch, at a certain stage, suddenly breaks in the middle where a faint bluish flame takes the place of the usual whitish light and at the same instant *a sharp noise is heard,* due to the inflammation of the explosive mixture at this part of the vibration. It is hardly necessary to say that as the vibration is quickest at the midway point, coming to a pause at each end of the arch, the gas becomes more largely mixed with air at the middle than towards the extremities of the motion, and is, therefore, at this point, earliest reduced to the state of an explosive mixture.

As we increase the velocity of the vibrations, the sonorous part of the arch extends towards the ends, until the path of the flame presents the aspect of a narrow bluish band irregularly serrated at top and flanked at the extremities by a tall flame of the usual whitish color. As might be expected, when the jet is revolved rapidly in a circle, the white light entirely disappears, and the ring of bluish flame which results gives forth a continuous but not distinctly musical sound. When made in a dark room these simple experiments were found to be unexpectedly interesting and beautiful.

(3.) As in the above cases the action is mainly traceable to the more rapid mingling of atmospheric air with the flame, it is natural to conclude that a like effect would be produced by passing *a current of air* upwards through the tube, and on trial this anticipation was strikingly verified. In order that the current may be evenly distributed, it is convenient to employ an argand burner, having the supply pipe at the side, and the central opening entirely free, so that the jet pipe may rise through the centre and the burner be adjusted to the proper distance below the flame and the bottom of the glass tube. The air conveyed to the argand burner through a flexible pipe, may be supplied either from the lungs of the operator or from an adjacent gasometer. In most cases the action of the current is more easily managed when the apertures from which it flows are some two or three inches below the bottom of the resonant glass tube.

With this arrangement, and a proper graduation of the current of air impelled into the tube, we can cause the flame to sing when the other methods above described have failed to produce any effect. When the flame is not far from the position in which it would spontaneously sing, the *lightest breathing through the argand pipe is sufficient to bring it to the sounding state*, and to maintain a clear, smooth tone. Even when the flame is large and otherwise not readily susceptible of the sonorous action, a stronger current of air applied nearer to the bottom of the resonant tube will rarely fail to bring on the musical vibrations. It should be mentioned that these effects can be produced in a simpler but less satisfactory manner by using, instead of the argand burner, to conduct the current, a common glass tube, bent suitably, and held near the jet pipe below the opening of the resonant tube.

The sound familiarly observed when a flame of any kind is blown upon, and especially when the air is forced into or through the flame, as in the case of the jet of a blow-pipe, was long ago referred by Faraday to the combustion of an explosive mixture formed by the air and burning matter. The sound produced by a blazing fire of wood or bituminous coal, as contrasted with the silence of a flameless mass of ignited anthracite, is an obvious illustration of the same principle. But the experiments above described show the operation of this law under conditions which enable us more satisfactorily to mark the origin of the sound and the gradations by which it accompanies the formation of the explosive mixture.

(4.) The *intermitting character* of the combustion in a singing flame has been beautifully shown by Prof. Tyndal, by causing the light of the flame to fall upon a revolving mirror, from which it is reflected so as to form a series of images on a distant screen. A similar resolution of the flame into successive explosions is more simply exhibited by *moving it rapidly* to and fro, or better still, by giving it a steady *revolving motion* within the tube. In using the former method, the jet pipe may be attached to the common gas stand by a short piece of flexible hose, and passed through a ring so placed as to restrict the vibrations to a range less than the diameter of the tube. A sufficiently regular movement may then be given by the hand. If now, we adjust the flame in the tube, so that it will not begin to sing for some time after the vibration has commenced, or until the tube is further lowered, we observe at first merely the continuous band of light due to the permanence of the visual impression, but, as soon as the singing commences, this band becomes waved or serrated at the top, and with a proper velocity divides into nearly separate columns of flame, with obscure spaces between.

The effect is, however, far more striking, *when the flame is made to revolve* at a uniform rate in the tube. In this case, so long as it remains silent, it presents the appearance of a hollow cylinder or short tube of whitish light; but the moment the singing begins, the cylinder assumes a toothed form on the top resembling a brilliant crown, and *divides itself into a number of narrow luminous columns, separated by bands nearly or quite deprived of light.* It is hardly necessary to say that the obscure spaces mark the moments in the rotation when the explosions occur, and the bright ones the successive intervals between them. With a given rate of rotation, as might be expected, the number of these subdivisions is greater in a short tube than in a long one, and is greater when the tube is yielding one of its harmonic notes than when giving its fundamental sound. In the same tube the number of subdivisions diminishes as we increase the velocity of rotation, a less number of vibrations or explosions in this case corresponding to one revolution of the jet.

To render the effect visible at a distance, it is of course necessary to use a large tube and flame. It is, however, beautifully distinct when the tube is some six feet long, by one and a half inches in diameter, and the flame three quarters of an inch in height. The mechanism employed to give rotation to the jet consists of a grooved wheel connected by a band with a small pulley. Into the latter the supply pipe enters from below by a smooth gas-tight joint, which allows the pulley freely to revolve. The jet pipe secured to the middle of the upper face of the pulley tapers to the extremity, and rising to the height of six or eight inches, is elbowed near the top so as to give the flame when revolving an orbit of nearly an inch in diameter.

When the experiment is in progress, the appearance of the horizontal portion of the jet pipe affords incidentally a very pretty proof of the intermittence of the singing flame. As each successive explosion makes this part strongly visible, it assumes the aspect of *a number of brilliant spokes* corresponding to the subdivisions of the crown of flame; and if to vary this effect we blacken the horizontal part of the pipe, and fasten near its outer end, or where it resumes a vertical direction, a brilliant bead of glass or metal, we are presented with *a circle of starry points*, each of which, by a proper adjustment of the motion, appears to be at rest.

(5.) The following proof of the intermitting nature of the singing flame, suggested by the effects just described, is at once so simple, and so readily seen at a distance, as perhaps to merit a place among useful lecture-room illustrations. In this experiment the jet-pipe bearing the flame is held at rest in the tube, and the required effect is produced by receiving the light on a circular disc of thick pasteboard or of metal, some six inches in diameter, supported near the tube on a horizontal axis around which it may be revolved by the impulse of the hand. The face of the disc next the tube, colored of a dead black with paint or a covering of cloth, should have a narrow strip of white paper fastened upon it in a radial direction, or a small circular bit of the same placed near the edge. If both faces are used alternately, we may affix the white bar to one and the dot to the other.

On bringing the six feet tube down over the flame, and giving rapid motion to the disc, we remark that so long as the flame continues silent, the bar or dot is quite invisible; but, as soon as the sound commences, the black disc becomes diversified by a series of whitish images of one or other of these objects arranged at equal intervals around the central point. It is scarcely necessary to say, that the number of these images, as well as their apparent motion or rest, will depend on the time of rotation, as compared with the intervals of the explosions of the flame. Should it happen that the period of one revolution of the wheel is precisely that of a certain number of the explosions, neither more nor less, or that of any multiple or sub-multiple of this number, the images of the bar or dot will continue in each successive rotation to present themselves at the same points; but, should this relation not subsist, these images will be seen to shift their places on the disc, sometimes appearing to advance, and at others to retreat.

At the request of Mr. Bouvé, Dr. A. A. Hayes repeated briefly, "An account of the present state of chemical knowledge in relation to alcoholic beverages and their falsifications," prepared for another Society.

He stated that the products of fermentation, whether resulting from "worts," in which the altered starch of grains furnishes the material, or the "must," of expressed juices of grapes, fruits, and plants, might be for convenience classed as *Wines*.

Thus ale, which is the product of the first fermentation of malted barley, may be considered the wine of malt; the addition of hop extract, being a matter of taste, which replaces the fruit extract in wines. If we include also the mixtures of cane products, sugar and water, honey and water, and finally skimmed milk, we have the sources of various resorts for producing exhilaration or intoxication, adopted by all nations.

The first chemical change in many of the mixtures used is produced by the remarkable body called diastase, which has the power of converting nearly two thousand times its own weight of starch into dextrine, or about half that quantity into grape sugar. This body is developed in the act of germination in grains and seeds; and probably in this principle of malted barley we have the type of a class of these substances, which, in different ways, act to produce remarkable transformations in organic bodies.

The second change, which demands attention, is that of the conversion of dextrine and glucose,—the sugar of fruits,—into *alcohol*, which remains dissolved in the fluid. This breaking up and rearranging of the elements of sugar is effected, as is well known, through the aid of the *beer yeast plant*, usually. Like diastase, the beer yeast plant is endowed with life, and has the power of communicating motion to organic and organized matter, resulting in change of composition. In so simple an expression of the phenomena of beer, or wine production, we have omitted some most important substances, which participate in the changes. These are the natural fixed oils and fats, and the volatile odorous bodies, in grains; but more especially in grapes, fruits, cane products, &c. Thus the hop extract, added before fermentation, to ale, beer, or porter, becomes altered, as do the grape oils; and the remark applies to all known cases of fermentation of mixed solutions. Mature grapes contain a natural ferment, in its appropriate cells, requiring, to bring its affinity in view, only that the cell walls and tissues of the fruit be broken, so as to provide fluid sugar, on which it reacts. Fermentation, which at a temperature of 70° F. commences immediately in grape juice, developes besides alcohol a whole class of new bodies. So in the fermentation of grains, the fixed bland oils of the seeds, slightly altered, remain; while more volatile odorous oils are directly produced from materials present. Now, these oils deserve special attention, because on the production of these, and their subsequent further change, the money value of the beverages depends. A very large consumption of beverages is supplied by the first fermentation of the materials named, and these alcoholic mixtures also form the basis of the *spirit* manufacture.

The second fermentation of wines is perhaps more important than the first. In this, the alcohol remaining almost unaltered, the greatest changes take place in the fruit extracts and oils. Fruit extracts lose their acidity and much saline matter, while the presence of acids leads to the production of *ethers*, from oily bases present, which then give their odors to the wine. It is apparent that the proportions, and even kinds of ethers present, may vary; but a general predominance of one designates a wine.

Closely connected with the presence and kind of ether, are the effects of wine on the human system; those wines having much ether and little alcohol proving exhilarating; while the alcoholic and oily wines may be distinguished as intoxicating beverages.

In the spirit manufacture, after the first fermentation has ceased, distillation follows for the separation of alcohol from the non-volatile organic matters. Here again the volatile oils are characteristic bodies, and impart their odors to the spirits in a strongly marked degree. Brandy, whiskey, rums, corn and potato spirits, have their values based on the kind and quality of oil each contains. Their other constituents, in pure samples, are simply *odorless* water and *odorless* alcohol.

In all pure distilled spirits, with the oils, certain acids are connected, and the etherification of the oils slowly proceeds, as in the case of wines. The distinction between new, or raw spirits, and old, or matured spirits, arises from this etherification of the oils, commonly called *fusel* oils. The highly aromatic brandies of the last century, like the "Nantes" brandy, were distilled from partly matured wines, and contained all their ethers.

The falsifications of beers, wines, and spirits, so far as our commerce is concerned, are extensive, and will be alluded to briefly.

In the early manufacture of brandy, wines of low cost were distilled, but the more general demand for wines, with occasional short crops of grapes, have led to another mode of producing the enormous quantity of raw spirits now consumed.

After the grapes have been pressed and fermented, the residue, consisting of skins, kernels, and pulpy parts, is mixed with solutions of glucose, obtained from starch; odorless spirit is added, and the artificial must thus formed is fermented cautiously. Distillation separates a spirit, loaded with the oils of grape fermentation, to such an extent that an excess of grape oil, besides brandy, is obtained in rectification. This is the brandy of the present day, and forms the large bulk of our importation. The oil of grapes, under the name of "*Cognac Oil*," is vended for a moderate price, and becomes a large *producer* of brandy, by a very short process.

As the oils known as fusel oils are less volatile than alcohol, a managed distillation permits us to separate the oil from alcohol, which then becomes odorless or neutral; cognac oil, mixed with neutral spirit, instantly produces factitious brandy; sugar and coloring matter being adjuncts. Such a base mixture is largely made in this country; and as it has no principle capable of maturing, it should take a place below the raw spirits.

Falsified wines are made here from mixtures of spirit, water, sugar, and low-priced wines, as imitations of wines of well-known names. Sparkling wines are made on a large scale, from fruit wines, or sweet wines, with sugar and carbonic acid mechanically introduced, and such wines are probably often imported. Sherry and Madeira, as imported, have spirits mixed with the wine, and often *forty* per cent. of proof spirit is contained in them.

Both ale and beer are sold which have been mixed with low-priced spirits, to increase their intoxicating effects. But the most demoralizing intoxicating beverages are the new, or raw spirits, so common. In many of these the fusel oils exist to the point of saturation. These oils have specific actions on the system, and the ethers are not present.

In reply to a question from Dr. Abbot, Dr. Hayes stated that he considered the fusel oils as poisons, small portions of their vapors causing irritation.

Dr. Bacon observed, that, according to Schauenstein of Vienna, a considerable proportion of chloroform is invariably found in Amylene, the new anæsthetic agent, when prepared (as usual) by distilling fusel oil with a solution of chloride of zinc.

Dr. A. A. Hayes made a communication, reporting progress in experiments, elucidating points in connection with the composition of the various phosphates of lime, proceeding from changes during decay.

He had stated in earlier papers that the so-called bone phosphate of lime, of bones forming the earthy part of the "phosphatic guanos," or the guanos of the rainy latitudes, in presence of decaying organic matter, had lost one, two, or more equivalents of the lime base; leaving a monobasic or bi-basic phosphate. In the subsequent actions, this lime disappeared by solution, while the apparently more soluble phosphate remained.

It was deemed important, at this stage of the investigation, to study the changes which the bone phosphate had suffered in the midst of putrefying matter, resulting in the production of Peruvian guano, where the conditions are peculiar. Analyses of a number of samples, from the different localities, have proved that in every case the lime of the bone phosphate has in part become engaged with other acids; the oxalic acid being generally the most powerful acid present; while the phosphoric acid disengaged, has united to ammonia and other bases found in the mass. This change of composition in the bone phosphate, under entirely different conditions of exposure, is interesting, apart from the additional evidence it affords *of a natural proximate decomposition of the tri-basic phosphate*, without the presence of abundance of water. In this new case, it is true, the phosphoric acid finds other bases to combine with; while in those before reported it remains in larger proportion with the lime and water only. It is generally believed that Peruvian and similar guanos are alkaline in constitution, from the fact that carbonate of ammonia is readily formed from them. Perfect samples are, however, always in the *acid state* naturally, and a large part of the volatile matter consists of salts of the volatile, oily acids and ammonia; carbonic acid being rarely found, unless as part of calcareous matter, accidentally present. This fact establishes a resemblance which was unexpected, between the two different modes of decomposition of organic matter; one in presence of abundance of water; the other, where mere moisture and decaying organic remains are abundant.

Another course of experimenting has been pursued on this subject of bone decomposition, which had been alluded to before, and the results have a more general interest, as they affect physiological conclusions. Chemical physiologists, with hardly an exception, consider the earthy part of bones as composed of tribasic phosphate of lime, bi-basic phosphate of magnesia, carbonate of lime, and fluoride of calcium; alkaline salts being occasionally present. This mixture of earthy bodies, rarely definite, is subject to great variations of proportions in disease, and it is so loosely connected with the cartilage, that absorption and deposition take place, without derangement of vital functions.

On looking over the evidence supporting this important conclusion, one is surprised to find that it is all derived from two courses of analytical inquiry.

1st. Carefully cleansed and fresh bones are treated by means of dilute acids, for the solution of the earthy salts, leaving the cartilage in nearly its natural form. Carbonic acid is usually determined in this operation, and the phosphoric acid and bases form the solution ; the acids and bases are then apportioned by calculation.

2d. Bones which have been washed, and reduced to coarse powder, are heated with free contact of air, until the organic part of the cartilage is destroyed ; the remaining ash is then analyzed for acids and bases, and the compounds calculated.

If we carefully make the analytical experiments, on exactly the same portion of fresh bone, by *both these methods*, we do not arrive at corresponding results ; and it will thus appear, that neither of these courses will bear criticism. As this part of the subject will be presented to the Society in connection with the evidence, it may be remarked now, that the kind of information such results afford, is like that we obtain respecting the salts existing in vegetable productions, when we analyze their ashes, instead of confining our trials to the tissues and cell walls.

In the analyses of osseous tissue which have been made, since my communication to the Society, the simple process of decomposition in water has been continued in application. As before observed, the bones readily impart their earthy part to this fluid, both before and after the cartilage becomes changed, in the act of decomposing into simpler forms of matter. Thus far, the results have accorded with those of earlier trials, showing that in the osseous tissue, *bi-basic* phosphate of lime may exist, and that the presence of mono-basic phosphate is not inconsistent with a neutral condition in the tissues. It remains to be proved that *protein*, as well as water, may act as a constitutional element equivalent to a base, in connection with lime, to form double phosphates ; and we shall then have a simple and consistent explanation of the fact of the existence of mono and bi-basic phosphates, as now found in the secretions both healthy and morbid. The large number of analyses required in the research delays progress, and must be an excuse for the incompleteness of the report at this time.

Dr. S. L. Abbot exhibited several figures of microscopic objects, done by the new process of Photo-Lithography.

This process is a new invention, the result of the joint labors of Mr. J. A. Cutting, Photographer, and Mr. S. H. Bradford, Lithographer, both of Boston. These gentlemen have succeeded in imparting a sensitive surface to the lithograph stone, so that the image of the object may be thrown directly upon it, as in the ordinary method of photography. The photograph thus produced may be printed from directly, by the common lithograph processes. In the case of the figures exhibited, the image magnified by the microscope was thrown by means of a camera upon the prepared stone. The discovery promises to be one of very great value. Among the figures exhibited were photo-lithographs of blood globules, the cornea of a fly's eye, sections of wood, &c.

The Corresponding Secretary read the following letters, viz:—

From the Société Royale des Sciences de Liége, April 20th, 1856; Zoölogisch-Botanischer Verein, Vienna, June 23, 1857; Royal Society of London, August 6, 1857; Royal Institution of Great Britain, November 16, 1857; Geological Society of London, December 3, 1857; Public Library of Boston, January 20, 1858; Corporation of Harvard College, Feb. 4, 1858; Essex Institute, Feb. 11, 1858; Lyceum of Natural History, New York, Feb. 16, 1858; New York State Library, Feb. 27, 1858, acknowledging the receipt of the Society's publications; Société Royale des Sciences de Liége, April 20, 1856; the same, June 5, 1856; Zoölogisch-Botanischer Verein, Vienna, June 10, 1857; Académie Royale des Sciences de Stockholm, July 10, 1857, presenting their various publications; H. Davis, Feb. 2, and J. A. Swan, Feb. 13, acknowledging their election as Corresponding Members; and from H. Davis, Jan. 19, offering to send specimens to the Society.

DONATIONS TO THE MUSEUM.

January 6, 1858. Female Anableps Gronovii, with ovary, distended by the embryos, exposed to view; *Aspredo levis*, with its ova adherent to the abdominal surface; and a species of Bagre; all from Surinam; by John Green, Jr. Osseous Schlerotic coat of the eye of a Sword-Fish, and a large Hornet's Nest; by Theodore Parker. Fossils and Reptiles; by H. Davis.

January 20. A Chinese Yam, *Dioscorea batatos;* by D. T. Curtis. A large and very valuable collection of Shells from the coast of Mazatlan; by A. A. Gould. Lava from Mount Vesuvius; by T. J. Whittemore. Silicious Infusorial Earth from Dedham; by Thomas Hollis. Shells, Mollusks, and Sponges, by N. E. Atwood.

February 3. An immature specimen of Cordiceps ——— growing upon a common Fly; by Townend Glover. Specimens of the Spanish Earth Almond, *Cyperus esculentus;* by Dr. C. T. Jackson. Clinton Iron Ore; from Dr. H. Bryant. Skull of a Pointer Dog; by E. Samuels. Ruddy Duck, *Erismatura rubida*, from Massachusetts, and Labrador Duck, *Camptolaimus Labradorus;* by Caleb Loring, Jr. A Parrot, *Psittaculus* ———; by Dr. S. Cabot, Jr. *Gampsonyx Swainsoni* from South America; by J. M. Forbes.

February 17. Larvæ of Buprestis which had eaten into wood, and a very large crop of the Turkey; by Dr. H. Bryant. Banded Gurnard, *Prionotus lineatus*, Dekay, and two specimens of American Hound-Fish, *Mustelus canis*, Dekay; by Dr. J. N. Borland.

March 3. Skin of the Silky Monkey of Northern Brazil, *Midas rosalia*, Geoffroy; by Dr. S. Kneeland, Jr. Whin-Chat Warbler, *Pratincola rubetra;* European Tree-Sparrow, *Passer montanus;* Tawny Pipit, *Anthus campestris;* Reed Wren, *Cysticola arundinacea;* Great Tit, *Parus major;* Java Sparrow, *Amadina oryzivora;* Crested Lark, *Alauda cristator;* Golden-tailed Parrot, *Psittacula surda;* Hooded Crow, *Corvus cornix;* by Dr. F. J. Bumstead; Sickle-billed Tree-Creeper, *Xiphorhynchus trochilirostris;* by J. M. Forbes.

March 17. An excrescence upon the roots of coniferous trees, known as the White Mountain Potato; by L. M. Sargent, Jr. Tobacco-pipe Fish, *Fistularia tabaccaria*, from the coast of Massachusetts; by Dr. Brown, of Holmes's Hole. Barnacles from George's Bank; by Addison Gott. Nutmeg Pigeon, *Carpophaga œnea*, Lin.; by Dr. S. Kneeland, Jr. Brown-headed Barbet, *Megalaima caniceps*, Frank.; Red-backed Woodpecker, *Brachypterix erythronotus*, Vieil., male; exchange with J. W. R. Jenks. Great Tit, *Parus major*, Lin.; Cut-throat Finch, *Amadina fasciata*, Gmel.; Common European Quail, *Coturnix communis*, Bonn, female; Blue Tit, *Parus cœruleus*, Lin., male; Grey Partridge, *Perdix cinerea*, Lin., young; Double Snipe, *Gallinago major*, Lin., female; Marmora's Warbler, *Sylvia sarda*, Marm.; two specimens of European House Wren, *Troglodytes parvulus*, Koch., male and female; by Dr. F. J. Bumstead. Red-headed Guinea Parrakeet, *Psittacula pullaria*, Lin., female; by Dr. J. N. Borland.

BOOKS RECEIVED DURING THE QUARTER ENDING MARCH 31, 1858.

Edinburgh New Philosophical Journal. Nos. 11, 12. 8vo. Edinburgh, 1857. *From Prof. H. D. Rogers.*

Uber den Grünsand und seine Erläuterung des Organischen Lebens. Von C. C. Ehrenberg. 4to. Berlin, 1856. *From Prof. J. W. Bailey.*

Grasses and Herbage Plants. An Essay by T. Howard. 8vo. Pamph. New York, 1857. *From Dr. S. Kneeland, Jr.*

Observations on the Genus Unio. By Isaac Lea, LL.D. Vol. 6. Part 1. 4to. Phil. 1857. *From the Author.*

Geological Facts and Observations relating to the Ashby Coal-Field. By Ed. Hammatt, F. G. S. 4to. London, 1834. *From George N. Faxon.*

Exposition des Operations faites en Lapponie, pour la Determination d'un Arc du Meridien en 1801–3. Par Jons Svanberg. 12mo. Pamph. Stockholm, 1805. *From the Académie des Sciences de Stockholm.*

Annual Report of Geological Survey of State of Wisconsin for 1857. 8vo. Pamph. Madison, Wis. *From E. Daniels.*

Annual of Scientific Discovery for 1858. Edited by D. A. Wells, A. M. 12mo. Boston. *From the Editor.*

Geological Survey of Canada for 1853–6. 8vo. Also, Plans of Lakes, Rivers, &c. accompanying the same. 4to. Toronto, 1857. *From T. S. Hunt.*

Description of New Organic Remains from Northeastern Kansas. By F. B. Meek and E. V. Hayden, M. D. 8vo. Pamph. 1858. *From Albany Institute.*

Researches in Medical Terminology. By Bennet Dowler, M. D. 8vo. Pamph. *From the Author.*

Notice of Remains of the Walrus. Also, other scientific papers. By Joseph Leidy. 4to. Pamph. Philadelphia, 1857. *From the Author.*

Report of the Superintendent of the U. S. Coast Survey for 1856. 4to. Washington. *From Prof. A. D. Bache.*

Catalogue of New York State Library. Vol. 3. 8vo. Albany. *From Regents of the University.*

Remains of Domestic Animals discovered among Post-Pleiocene Fossils in South Carolina. By F. S. Holmes. 8vo. Pamph. Charleston, S. C., 1858. *From the Author.*

Notes on American Land Shells. No. 2. By W. G. Binney. 8vo. Pamph. 1857. *From the Author.*

Transactions of the Linnæan Society. 20 Volumes. 4to. London, 1791–1851.

Recherches sur les Ossements Fossiles. Par M. le Baron G. Cuvier. 5 vols. 4to. Paris, 1825. *From Dr. B. D. Greene.*

New Forms of Marine Diatomaceæ found in the Frith of Clyde and in Loch Fine. By Wm. Gregory, M. D. 4to. Pamph. Edinburgh, 1857.

Notice of new species of British Fresh-water Diatomaceæ. By Wm. Gregory, M. D. 8vo. Pamph. Edinburgh, 1857.

On Post-Tertiary Diatomaceous Sand of Glenshira. 8vo. Pamph. By Wm. Gregory. Edinburgh, 1857.

On a Post-Tertiary Sand containing Diatomaceous Exuviæ, from Glenshira. By Wm. Gregory, M. D. 8vo. Pamph. 1857. *From the Author.*

Beiträge zur Naturgeschichte der Trypeten nebst Beschreibung einiger neuer Arten. 8vo. Pamph. Wien, 1857.

Beitrag zur Fauna Dalmatien's. 8vo. Pamph.

Uber Raymondia Fr. Strebla Wd. und Brachytarsina Mcq. 8vo. Pamph. Wien, 1857.

Uber die Paludinen aus der Gruppe der Paludina viridis Poir. 8vo. Pamph. Wien, 1857.

Die Linsengallen der Österreichischen Eichen. 8vo. Pamph. Moscau, 1856. *From G. Frauenfeld.*

United States Japan Expedition. By Com. M. C. Perry. Vol. 2. 4to. Washington, 1856.

Explorations for a Railroad Route from the Mississippi River to the Pacific Ocean. Vols. 2, 3, 4. 4to. Washington.

Report of Secretary of War on the Importation of Camels for Military Purposes. 8vo. Washington, 1857.

Fourth Meteorological Report. By Prof. J. P. Espy. 4to. Washington, 1857.

United States Naval Astronomical Expedition to the Southern Hemisphere. Vol. VI. 4to. Washington. *From Hon. Charles Sumner.*

Journal of the Academy of Nat. Sciences of Philadelphia. Vol. 3, Part 4. Phil. 1858. 4to.

Proceedings of the Academy of Nat. Sciences of Philadelphia. pp. 149 to 228. 8vo. Phil. 1857–8. Also, Title-page and Index to Vol. 8.

Silliman's American Journal of Science and Arts. Nos. 73 and 74. 1858. New Haven.

The Microscope and its Revelations. By W. B. Carpenter. With Appendix, &c. By F. G. Smith. 8vo. Philadelphia, 1856.

New York Journal of Medicine. Vol. 3. Nos. 1 and 2. 8vo. N. Y. 1858.

Mémoires de la Société Royale des Sciences de Liége. Tomes X. et XII. 8vo. Liége, 1855, 1857.

Canadian Journal of Industry, Science, and Art. Nos. 13 and 14. Toronto, 1858.

New York Journal of Medicine. Vol. IV. Nos. 1 and 2, for January and March, 1858.

Annals of the Lyceum of Nat. History of New York. Vol. VI. Nos. 5, 6, 7. 8vo. N. Y. 1855–6.

Transactions of the Albany Institute. Vol. IV. Part 1. 8vo. Albany.

Proceedings of the American Philosophical Society. Vol. VI. No. 58. July to Dec., 1857. 8vo. Philadelphia.

Catalogue and Alphabetical Index of the Astor Library. 2 Parts, A—L. 8vo. New York, 1857.

Natural History Review. No. 4. October, 1857. London.

Catalogue of Mazatlan Shells in British Museum. 12mo. London, 1857. Collected by F. Reigen. Described by P. P. Carpenter.

Proceedings of American Academy of Arts and Sciences. Vol. 3. pp. 249-416. 8vo. Pamph. Boston, 1857.

Canadian Naturalist and Geologist. 8vo. Vol. 2. Nos. 5 and 6. Montreal, 1857.

Archiv für Naturgeschichte. Gegründet von A. F. A. Wiegman. Nos. 4, 5, 1856. Berlin.

Recueil des Actes de l'Academie Imperiale des Sciences, &c. de Bordeaux. 18iéme année. 1856. 2e Trimestre. 8vo. Pamph. Bordeaux.

Verhandlungen des Zoölogisch-botanischen Vereins in Wien. Band VI. Jahr. 1856. 8vo. Wien.

Kongliga Svenska Vetenskaps-Akademiens Handlingar. Ny Följd. Första Bandet. Första Häftet. 4to. 1855.

Württembergische Naturwissenschaftliche Jahreshefte. Nos. 3, 1852; 3, 3, 1856; 1, 1857. Stuttgart, 1856–7.

Konigl. Vetenskaps-Akademiens Handlingar, för àr 1854. 8vo.

Ofversigt af Kongl. Vetenskaps-Akademiens Forhandlingar Trettonde Argängen, 1856. 8vo. Stockholm.

Address at the Anniversary Meeting of the Royal Geographical Society. By Sir R. Murchison, President, (Proceedings, No 10.) 8vo. Pamph. London, 1857. *Received in Exchange.*

Annals and Magazine of Natural History. Vol. 20. No. 121. (Supplementary.) Also Nos. 1 and 2, Vol. I. 3d Series. London, 1858.

Quarterly Journal of the Geological Society. No. 52 and 53. 8vo. London, 1857.

Birds of Asia. By John Gould, F. R. S. &c. Folio. 2 Parts. London, 1850.

Monograph of the Trochilidæ or Humming Birds. By John Gould, F. R. S. &c. Folio. 3 Parts. London, 1849.

Mammals of Australia. By J. Gould, F. R. S. &c. Folio. London, 1845. *From the Courtis Fund.*

Life and Times of Aaron Burr. By J. Parton. 8vo. N. Y. 1858. *Deposited by the Republican Institution.*

April 7, 1858.

The President in the Chair.

Mr. John Green reminded the Society that, in some remarks made at a former meeting, he had stated that all fish scales have the chemical constitution of bone, and that in their structure and mode of growth also, they present many of the characters of true bone. A section of the scale of *Labrax lineatus*, (Cuvier,) shows lacunæ of an elongated form, which in figure and in arrangement resemble those seen in the scale of *Thynnus vulgaris*, (Cuvier,) which has always been known and described as bone.

He called particular attention at this meeting to an observation which he had made upon the scales of Megalops, a fish from the Gulf of Mexico, and commonly classed in the order Clupeæ. In this fish the upper or ornamental layers of the scale contain lacunæ which correspond exactly, in form and arrangement, with those of the ganoid scales of Lepidosteus. A further resemblance to ganoid scales is seen in the fact, that the concentric ridges which mark the upper surface of the scale of Megalops, are armed with tooth-like projections of the hardness of tooth enamel.

Prof. Agassiz said that he attached considerable importance to this unexpected point of resemblance between Megalops and the ganoid fishes. He had been inclined, upon other grounds, to consider Megalops to be nearly allied to the class of ganoids, as is generally supposed.

The President gave the result of some examinations of a large number of fœtal pigs.

He thought that zoölogists had not given sufficient importance to the very slight connection between the fœtus and the parent. Strictly speaking there was no placenta—the vessels of the fœtus and the parent being brought in relation only by means of very minute diffused villi and slight foldings of the chorion. These conditions are intermediate between those of the marsupials and the ruminants, and make the transition so gradual, that the separation of the Mammalia into two sub-classes, viz: the Placentals and Implacentals, is not well defined.

He had also found in one litter three fœtuses in which the brain protruded through the collapsed cranial walls, and was represented by a very small and imperfectly developed mass of cerebral matter. This would probably have resulted in what is called the anencephalous condition. In addition to the above malformations, he had met with one monstrosity, consisting of a single head, with a small opening on the occiput, and having two sets of upper extremities; the lower part of the body was double from the lumbar region. The livers of the two formed a hernia through the umbilicus. There was but one amnios. This monster belonged to the class of Janiceps, with inferior duplicates, the opening on the occiput being the result of the union of two external ears.

Prof. Agassiz remarked, that the inferences drawn from these anatomical relations by the President were peculiarly interesting, having a paleontological as well as physiological bearing, the family of pachyderms being geologically the next in age to the marsupials. He believed we must be prepared to find every possible grade in pachyderms, and still more loose connections, bringing the marsupials nearer the ordinary mammalia than they have hitherto been ranked.

Prof. Agassiz gave an account of his recent visit to the reefs of Florida and his explorations of coralline growths. He estimated the rate of coral growth to be only a few inches in a century, a tenth or twelfth part less than was formerly supposed; and, supposing the reef rises from a depth of twelve fathoms, he would calculate its age, upon arrival at the surface of the water, to be about twenty-five thousand years, and the total age of the four distinct concentric reefs of the southern extremity of the peninsula, to be one hundred thousand years. Prof. Agassiz in his remarks presented evidence that Millepora is not a Polyp but a Hydroid.

Prof. Wm. B. Rogers said that the physical conditions could not have differed much in that region a hundred thousand years ago from what they now are, and consequently that such a calculation could reasonably be made upon the data accumulated by Prof. Agassiz.

Dr. Weinland called attention to a fact recently observed by him in Hayti, which seems to involve a more rapid growth of some kinds of corals, than is generally assumed for this class of animals. In a small coral basin, between the town of Corail and the island Caymites, which is never disturbed by vessels, the water being there much too shallow, he saw several branches of the large *Madrepora alcicornis* projecting above the surface of the water from three to five inches. These branches were dead, for corals always die soon after exposure to the air, while the rest of the stock, as far as it was under water, was in full life. This observation was made in the month of June. The question naturally suggested itself, when did those pieces which were now above water, grow?

A fact, to which he alluded on another occasion, at a meeting of the Society, viz: that during the whole winter season, (December, January, and February,) the level of the water all along the northern shore of Hayti is from four to six feet higher than during the summer season, being raised by a constant northerly wind during those months, suggested to him the idea, that those coral branches, as far as they were above water during summer, might have grown during a single winter of three months only. This would show a very rapid growth of this kind of corals. The fact that the Madrepores, when growing so near the surface, and, as stated above, partially uncovered during the summer, very often, in the course of a few years, give rise to small Mangrove islands, between the outside coral reef and the shore, was well known to a native mulatto sailor, whom Dr. Weinland employed there. As he had observed at a former meeting, there is hardly any change of high and low tide along that shore of Hayti; so that this can have no bearing on the present question.

The Librarian announced the exceedingly valuable donation of Dr. B. D. Greene, of the first twenty volumes of the Transactions of the Linnæan Society and of Cuvier's Ossements Fossiles. This donation makes the Society's set of the Linnean Transactions complete. It was voted to tender the thanks of the Society to Dr. Greene for his donation.

In announcing this valuable donation, Mr. Dillaway remarked that the Society had, on many previous occasions, been indebted to the liberality of Dr. Greene for additions to the Cabinet and Library. Within the past year he made a contribution of plants to the Herbarium of the Society which has largely increased the resources of the Botanical Department.

The President stated that a considerable sum having been subscribed for the purchase and stocking of an Aquarium, it would be advisable to appoint a Committee to attend to the matter. Accordingly, Dr. S. Kneeland, Jr., Mr. L. B. Stone, and Mr. Theodore Lyman, were chosen a Committee for this purpose.

The Secretary announced the resignations of the Curators of Entomology and Ichthyology, Messrs. Durkee and Atwood.

Dr. S. A. Green was elected a Resident Member.

April 21, 1858.

The President in the Chair.

Dr. C. T. Jackson, referring to a communication made by Mr. Green at the last meeting, upon the structure and composition of Fish Scales, reminded the Society of the discovery of Fluorine as a component of the scales of Ganoid Fishes, an account of which he had some years since laid before the Society, (see Proceedings, vol. v. p. 92.) He had found a sufficient amount of Fluorine in twenty-five grains of Gar-pike scales to etch a sentence in glass. This discovery allied the scales of the Ganoids to the enamel of teeth. Fluorine had before been found in fossil fishes, but it was believed to be the result of infiltration from the soil.

Dr. A. A. Hayes presented a specimen of Cannel Coal from a locality nine miles below the Kanawha River, Virginia; and made some general remarks upon the products of coal distillation, illustrating the subject by exhibition of some of the products.

Dr. Charles Pickering read some memoranda formerly made by him on the stinging power of the *Physalia;* found to reside in the blue bead-like knobs of the long cords which the animal keeps continually letting down and drawing up. Under the microscope, the surface of these knobs was observed to be occupied by minute cells or vesicles, each containing an elastic hair-like filament, "coiled up like a spiral spring." When touched with the finger, the filament uncoils and shoots forth into the flesh; the spiral corkscrew manner of entering accounting for the pain, and for its short duration. Out of the water, the knob adheres to the finger; and when drawn back a little, the bundle of fine hair-like filaments in the reflection of the light becomes visible to the naked eye.

On the return of the U. S. Exploring Expedition, a distinguished anatomist examined the drawings of these thread-vesicles, and pronounced them "spermatozoa." Dr. P. had never seen unequivocal spermatozoa; and could not say, whether they are animals or organs. The above-described thread-vesicles are unquestionably organs; and are identical with the "lasso-cells" observed by Agassiz in other zoöphytes. In the Physalia, the thread-vesicles were observed sometimes to become detached spontaneously, floating off with the filament closely coiled in the interior, ready to shoot forth. The analogy with pollen deserves perhaps further inquiry; especially as zoöphytes, in their structure, station, and the surrounding external circumstances, have many points in common with plants.

Prof. Agassiz said that he had made minute examinations of the lasso cells upon living coral. To illustrate the difficulty attendant upon such a study, he cited the fact that as eminent a naturalist, even, as Rudolph Wagner, at first described them as spermatozoa, and that they have even been considered as clusters of parasitic Vorticellæ. Prof. Agassiz found that these bodies were globular or ovate cells, containing a coil, and that the two forms existed in every part of the body, although one form was generally more abundant than the other. The lasso is really a tube, which, in its extension, is inverted, and the continuity of the cell and tube can be readily determined. The mechanism by which the inversion is effected is a series of stiff bristles, which are within the tube when it is contracted, and which serve as a spring to invert and distend the thread, the bristles then coming upon the external surface. The tubular thread does not always uniformly taper, but sometimes suddenly contracts in size. As to their relations as sexual organs, they appear to be equally numerous in males and females. Prof. A. wished to be understood that what he brought forward as new was the direct evidence that the thread is hollow, and that it is everted in the process of throwing out.

Dr. C. T. Jackson presented a copy of William McClure's Geological Map of the United States, which had been reprinted by M. Jules Marcou, as the first geological map of the United States. It presents the great outlines of American Geology with considerable accuracy, although the map is necessarily incomplete, as there had been, at the time of its publication, but cursory surveys of the country.

Dr. Jackson presented, also, in behalf of M. Marcou, a Geological Map of New Mexico, embracing his surveys between 103° and 109° of longitude, and between 30° and 35° of latitude. This map presents the outlines of the Quaternary, Cretaceous, Jurassic, New Red Sandstone, Carboniferous, Granite, Gneiss, Porphyrous Trap, and Volcanic Series of Rocks.

Dr. J. remarked that few American geologists had made such extensive explorations of North America as M. Marcou, though, from their very extent, his researches could not be so complete as those of local geologists.

Prof. Agassiz said that the labors of M. Marcou in this country had been criticized and disparaged, as if he had undertaken a general and complete treatise upon the geology of America; whereas his investigations were principally directed to a comparison with the equivalent formations of Europe.

The Curator of Radiata, Mr. Theodore Lyman, presented in the name of Prof. Agassiz, a number of Echinoderms collected by Prof. A. and Mr. James E. Mills upon Grand Manan Island, N. B.

Prof. Agassiz, in reply to a question from Mr. James M. Barnard, who said that he had heard of Echinoderms burrowing into hard rock, observed that he had no doubt that they do burrow into limestone, as they are found in holes just the size of the animal. Such a process might be effected by their vibratory ciliæ.

Prof. Agassiz, in reply to a question from Dr. C. T. Jackson, whether the fishes of the European coast could be transplanted to the shores of America,—said that it was extremely doubtful. From a general point of view he should not suppose that any family of fishes, which have no representatives here, could flourish on this coast; but that perhaps fish belonging to the same family with the haddock and hake might be naturalized.

Dr. Chas. Pickering alluded to the geological nature of the European coast, as bearing on the question, that being the only limestone coast with which he was acquainted, with the exception of those of coral regions.

The Corresponding Secretary read the following letters, viz.:—

From G. C. Swallow, accepting membership; from the Société Royale des Sciences de Liége, April 20, 1856, and June 5, 1857, presenting its Memoirs, and from the same, April 20, 1856, acknowledging the donation of the Society's publications.

Mr. Charles Stodder presented a specimen of Trilobite, (*Paradoxides Harlani*) from Braintree, which exhibited the sculpture of the external integument of the shell upon the under side of the head, and which from its delicacy and extreme thinness is rarely preserved. He remarked that whilst the ornamentation of the integument of the upper surface varies with the genera or species, according to Burmeister, (Organization of Trilobites,) that of the under side is the same in all. If this were true, he thought it would prove without a parallel in any other so numerous a class of animals.

Annual Meeting, *May* 5, 1858.

The President in the Chair.

The Annual Reports of the Treasurer, Librarian, and of all the Curators, excepting those of Ichthyology and Crustacea, who were absent from the city, were read and accepted.

Messrs. Whittemore, Sprague, and Durkee, were appointed a committee to audit the accounts of the Treasurer.

Messrs. Simeon Shurtleff, M. D., of Westfield, Mass., and C. P. Dewey, of Rochester, N. Y., were elected Corresponding Members, and Messrs. Wm. E. Coale, M. D., and Alexander E. R. Agassiz, were elected Resident Members.

The Society then proceeded to the choice of officers for the ensuing year. Messrs. Kneeland and Storer were appointed scrutineers, and the following named officers were declared elected :—

President,

Jeffries Wyman, M. D.

Vice-Presidents,

Charles T. Jackson, M. D.   D. H. Storer, M. D.

Corresponding Secretary,

Samuel L. Abbot, M. D.

Recording Secretary,

Benj. Shurtleff Shaw, M. D.

TREASURER,

Amos Binney.

LIBRARIAN,

Charles K. Dillaway.

CURATORS,

Thomas T. Bouvè,	*Of Geology.*
John Bacon, M. D.,	*Mineralogy.*
Charles J. Sprague,	*Botany.*
Thomas M. Brewer, M. D.,	*Oölogy.*
Henry Bryant, M. D.,	*Ornithology.*
Thomas J. Whittemore,	*Conchology.*
J. Nelson Borland, M. D.,	*Herpetology.*
Alex. E. R. Agassiz,	*Entomology.*
S. Kneeland, Jr. M. D.,	*Ichthyology.*
H. R. Storer, M. D.,	*Crustacea.*
Theodore Lyman,	*Radiata.*
John Green,	*Comparative Anatomy.*
Silas Durkee, M. D.,	*Department of Microscopy.*

CABINET KEEPER,

Charles Stodder.

Dr. S. Kneeland, Jr., made a communication on the habits of the Menobranchus, two specimens of which had been in his possession for nearly two years, and which are still apparently in good health.

These specimens, which he obtained in Portage Lake, which flows into Lake Superior, have not perceptibly increased in size during this period. During the last winter they did not change their skin; this was changed the year before during the month of December, coming away in shreds. In addition to what is mentioned on pages 152, 218, and 280, of Vol. 6, of the Proceedings of the Society, the following facts have been observed.

They do not like the sunlight; however sluggish they may be, they become agitated when placed in the sun, and at once attempt to get out of it, retiring, if possible, to a part of the vessel in the shade.

There does not appear to be any regular association of the movements of the anterior and posterior extremities; they are not moved alternately, but quite independently of each other's motions.

They seize living worms eagerly, and suck them down, if small, with a single sudden swallow; if the worm be large, it is swallowed by repeated suctions, the teeth preventing its escape; the act of suction may be seen by the movements of the impurities in the water, as it is drawn in and afterward expelled. They often miss the worm; sometimes it may be too far off, but at others so close to them that it seems as if their vision must be imperfect. They will not eat a dead worm, unless they have been kept without food for a considerable time.

They are most active at night, during which they move very rapidly, throwing themselves nearly out of water.

The branchiæ shrink both in length and diameter, and assume instead of a crimson an iron or slaty gray color; the extreme change from expansion to the smallest size, and vice versa, often takes place in a minute or two.

In the water of their native lake they were infested with a white parasitic worm, which attached itself very firmly to the skin and to the gills; in the Cochituate water they have been entirely free from these.

They have a habit of passing the fore feet alternately through the gills from above downward and forward, several times in succession, as if to clear these organs from particles of dirt and impurities floating in the water.

They almost always remain at the bottom of the vessel in the daytime, though occasionally they remain for a few minutes at a time suspended in the water with the nasal openings above the surface.

It is frequently noticed that after uncommon activity, and sometimes in the daytime, their excrement is seen in the water, as if these violent contortions of the body assisted in the performance of this act.

A few weeks ago, when they had eaten nothing for five months, four living minnows, one two inches long, were put into the vessel with them; of course, they were very hungry, but much to his surprise, three of the four fish were swallowed before the expiration of fifteen minutes, and among them the largest. After they had swallowed them, they seemed very uneasy, moving the bones of the head and jaws, and contorting their bodies in various ways, as if they did not feel quite easy in their stomachs; however they at last became quiet, but at the end of twenty hours they became uncommonly active, and the three fish were regurgitated, with the scales off, the eyes out, and the entrails of the smallest gone; they were perfectly white, and looked like ghosts of fish. It was either diet too gross for their delicate and weakened stomachs, or else not sufficiently comminuted for the action of their gastric juice.

Mr. H. J. Clark, referring to the opinion expressed by Prof. Agassiz at the last meeting, that those organs in hydra which are considered to be testes, are in reality clusters of superficial lasso cells, stated that he had detected spermatozoa in motion in these bodies. Prof. A. said that he now remembered having been informed by Mr. Clark of this fact, and that therefore the idea conveyed by him at the last meeting was incorrect. In his remarks made at that time upon the lasso cells, he desired to be understood that all which was original with him was the direct evidence that the lasso thread is hollow, and that it is everted in the process of throwing out.

Prof. Agassiz presented some observations upon Corals. He had been led by his investigations to classify corals under four different heads, belonging to four different classes of organized beings, as follows:—

1st. *Vegetable Corals.* These are Algæ, or at least vegetable productions, which in time accumulate in their cellular tissue so much lime as to resemble coral, and which form entire islands, as the Tortugas and Marquesas groups, the sands on the shores of which are composed of disintegrated particles of these vegetable growths. 2d. *Corals of Bryozoa.* The affinities of these are well known. They grow in clusters, and are genuine corals belonging to animals of the class of mollusks, and not polyps, though once thus considered. 3d and 4th. The remaining corals belong to two types, *genuine corals formed by Polyps* and *those* *belonging to Hydroid Acalephs, the Tabulata.* The Tabulata are known to be Hydroids by direct observation of the animal in Millepora recently made by Prof. A. in Florida. Of Rugosa no living types are known, and consequently its affinities must be determined by the structure of the solid parts. In this respect the Tabulata present striking differences from the genuine corals formed by the Polyps. These have vertical radiating partitions, extending from top to bottom, with transverse partitions extending only between two adjoining vertical partitions. In Rugosa this horizontal floor extends across the whole cavity of the animal, as in Tabulata; and the radiating partitions are limited in their vertical extent to the space between two horizontal floors. So that their affinities go with the Tabulata, in some of which there are traces of radiating partitions. Besides, in Rugosa, the quadripartite arrangement prevails as in Acalephs. The secretions of the Tabulata are *foot secretions*, whilst those of other corals are from the outer walls.

Mr. John Green gave the results of an analysis of the Scales of the Striped Bass, (*Labrax lineatus*) as follows, viz:—

In scales dried at 212° F., 45.9 per cent. of ash. 100 parts of ash contained of Lime, 48.36; of Magnesia, .99; of Phosphoric Acid, 50.65. This result is identical with the composition of bone ash. The structure of bone is different in the Ganoid fishes from that of any Cycloid or Ctenoid, and confirms the differences already established from the appearances of the scales. The scales of the Amia of the western waters, contain bone corpuscles of the same form and appearance as those of Megalops and Lepidosteus, showing a new analogy of Amia with Ganoid fishes.

Mr. Theodore Lyman, referring to a large fragment of Madrepore Coral, taken from the wreck of a British man-of-war, and which he had exhibited at a recent meeting, said, that he had since ascertained that the vessel was lost about the year 1806, or half a century since. The incrustation of the coral around the iron bolt shows that the diameter of the coral must have been about three inches, and such a shaft, he supposes, would have supported a very high stem, so that the rate of growth might have been perhaps half an inch a year.

Prof. Agassiz remarked that the observation of rapid coralline growth alluded to by Dr. Weinland, at the last meeting but one, was made upon a species of Madrepore likewise. In all the branching corals examined by him, such as Oculinas and Millepores, a wide expansion was formed at the base before the stem was elevated. He thought that the age of corals should not be estimated by their height or thickness, on account of the varieties of manner in which the stem rises from the base.

Dr. J. Mason Warren presented the brain of a Chimpanzee, the skeleton and skin of which are already in the Society's Museum. The animal was thirteen months old, and twenty-six inches in height. The measurements of its head were almost the same as those of the so-called Aztec children exhibited in Boston several years ago.

The Cabinet Keeper called the attention of the Society to an Aquarium, which had been temporarily deposited in the Museum by Mr. Tufts, of Swampscot, Mass.

Dr. S. Cabot, Jr., presented in the name of Henry D. Morse, Esq., specimens of a full-plumaged, male, Black-masked Ruddy Duck, *Erismatura Dominica*, and European Widgeon, *Mareca Penelope*, and read the following extract from a letter of Mr. Morse :—

"The former Duck (*Erismatura Dominica*) I procured on the 26th of September, 1857, on my arrival at the hotel at Alberg Springs, Missisquoi Bay, Lake Champlain. It was shot by a boy who had just returned from a day's sport on the opposite side of the bay." "The particular locality is an overflowed meadow covered with wild rice, a famous resort for the Black Duck and Teal." The boy informed Mr. Morse that the bird was alone, and that he was flying past him when shot.

The European Widgeon was killed in the year 1852, by Mr. Morse's companion at Little Egg Harbor, New Jersey, opposite Tuckerton.

Dr. Cabot, in presenting the specimens, remarked that he believed that there was no previous instance recorded of the Erismatura having been procured further north than the island of Jamaica, its habitat being South America. Of the Mareca Penelope, a few specimens have been procured on this side of the Atlantic, although it is exceedingly rare. Dr. C. reminded the Society that its Cabinet was already indebted to Mr. Morse for one of the most remarkable specimens to be found in any collection, viz: the wild hybrid of *Mergus cucullatus* and *Clangula Americana*, upon which he had read a paper a few years since.

The thanks of the Society were voted to Mr. Morse for his valuable donations.

May 19, 1858.

The President in the Chair.

The President gave an account of some observations which he had made upon the formation of the peculiarly shaped egg-case of Skates.

At a former meeting he had stated that in a single instance he had found one of these cases partially formed in the oviduct, and was struck with the fact that it contained no yolk. Through the kindness of Mr. Green, the Curator of Comparative Anatomy, he had had an opportunity of examining the oviduct of a skate in which an incomplete egg-case existed in each oviduct; two of the horns and the bundle of threads at their base, and a portion of the body of the case were already formed, but there were no yolks in the oviduct, and only one *corpus luteum* in the ovary, probably connected with the previous detachment of an ovum. These observations would seem to show that this egg-case is more or less completely formed first, the yolk subsequently introduced and closed in, contrary to the order of things with eggs generally. The materials of the egg-case were detected in the tubules of the gland of this oviduct, and consisted of granules and long slender threads. The case is formed in the central cavity of the gland, and, as it is built up, the formed portions gradually extend into the lower part of the oviduct. The ovulation of skates resembles that of birds rather than of ordinary fishes. In the latter the eggs are all formed simultaneously, and discharged at once or nearly so, while in the former, as in birds, one yolk descends in the oviduct at a time, is encased in the covering, and lost before another can go through the same process.

Prof. Agassiz said that the communication of the President was of importance, as it bore upon several physiological points now under discussion. He had been shown by the President the egg still in the ovary, (where it must have been fecundated,) and the shell below prepared to receive it. In this connection he was reminded of a fact noticed by himself some time since, with reference to those organs upon the side of the skate called claspers, and which are supposed to be used for prehensile purposes. It occurred to him that they might be organs of copulation, and he found that when they were rotated forwards and upwards, an opening in them was brought opposite to the spermatic duct, and he imagined that they could be introduced readily into the female organs, into the oviducts, and reach the glands described, whence the spermatic fluid would pass up. The President's observations rendered this view of the functions of the clasper still more probable. Plagiostomes have a very different method of reproduction from other fishes. Like birds, they produce few, but large eggs, and these are found to be of various sizes and different degrees of development in the ovary, indicating that several years are required for their perfect maturity, as is the case in turtles. These facts and others serve to confirm the affinities of the sharks and skates, and to separate them from fishes proper. Aristotle does not speak of Plagiostomes with fishes, but calls them Selachians, and Prof. A. follows the ancient naturalist, giving them the same name. If the Selachians constitute a natural class, then some of the data of palæontology may be better understood than they now are. Fishes are generally considered to have been the earliest animals created, but in fact they were not. The earliest were Ganoids and Selachians.

Prof. Agassiz made some remarks upon the differences exhibited between the coral stocks of Rugosa and those of ordinary corals.

Prof. H. D. Rogers exhibited his new Geological Map of the State of Pennsylvania, upon which he has been engaged for many years past.

The Pennsylvania portion of the Appalachian chain, he remarked, represents its characteristic structure better than it is elsewhere to be seen in the United States. The map has been constructed from the results of numerous surveys,—from the maps, profiles, and other drawings of the State engineers of canals,—reduced to a common scale, and corrected with the progress of geological research, and, in intricate districts, by trigonometric surveys. The Northeastern portion of the State especially, has been subjected to rigid topographical survey. Prof. R. also explained the processes by which a number of colors are put upon the map by a few impressions. Prof. R. also alluded to the existence of the remains of several species of the camel and horse, which has lately been demonstrated in the wide tertiary area of Nebraska and the neighboring regions.

Mr. C. J. Sprague exhibited an orange, partially covered with a black mould which has been very common this season on this fruit, covering the end where the stem was attached.

He had examined many to ascertain its character, but had not been able to identify it. Recently, however, he had found several of the fruit on which the mould had developed freely, and ascertained that the black stain was the *Antennaria* form of a *Capnodium*, probably the *C. elongatum*. This fungus appears first in a series of aggregated cells, which, applied end to end, creep over the object on which it grows, forming a thin, black crust. This is the state in which it has appeared on the oranges in abundance. But under favorable circumstances it finally builds up a vertical, thorn-like perithecium, producing either naked spores or true asci. The asci he had not found, but the perithecia were abundant on the specimen exhibited. This is the fourth matrix on which he had found this fungus:—on pear spurs, fallen leaves, pine trees, and oranges. Its growth is entirely external, as it falls away from the matrix in flakes, when dry.

Dr. J. C. White exhibited under the microscope specimens of the plant *Trichophyton tonsurans*, which grows parasitically upon the human body, on the hair and nails. These specimens were taken from the finger nails.

Mr. Edwin Wright, of East Boston, was elected a Resident Member.

June 2, 1858.

The President in the Chair.

Dr. Shaw announced to the Society his resignation of the office of Recording Secretary, for the reason that he had recently assumed new duties requiring his whole attention.

Dr. S. Kneeland, Jr., was chosen Secretary *pro tem.*

The thanks of the Society were unanimously voted to Dr. Shaw for his efficient and valuable services as Secretary of the Society for the last five years.

Dr. Abbot read a description of a new sparrow collected by Mr. Samuels in California, and described by S. F. Baird, Esq., of the Smithsonian Institute, as follows:—

AMMODROMUS SAMUELIS, Baird.

SPECIFIC CHARACTERS. Somewhat like to *Zonotrichia melodia*, but considerably smaller and darker. Bill slender, attenuated, and acute. Tarsus not longer than middle toe and claw. Above, streaked on the head, back, and rump, with dark brown, the borders of the feathers paler, but without any rufous. Beneath, bluish white, the middle of the breast, with sides of throat and body spotted and streaked with blackish brown. Wings above nearly uniform dark brownish rufous. Under tail coverts yellowish brown, conspicuously blotched with blackish. An ashy superciliary stripe, becoming nearly white at the bill, and a whitish maxillary one ; the crown with a faint grayish median line. Length, 5 inches ; wing, 2.20 ; tail, 2.35. *Hab.* Petaluma, Cal.

Prof. Jeffries Wyman gave a description of a monstrosity which he had recently dissected—a Cyclopean pig.

These animals are very liable to the various forms of monstrosity, and especially to cyclopism. In such cases there is a single eye in the median line of the forehead, symmetrical, with a pupil in the centre, and a lid above it ; if there is any projection above the eye, it is a nose. He criticized the artistic representations of Polyphemus, which have always made his eye either a right or a left one in the median line, which of course must be unsymmetrical ; every organ on the median line is always symmetrical ; hence the cyclopean eye is formed by the union of parts corresponding to two eyes, either the outer or the inner halves, either of which would make a symmetrical organ. In cases of double monstrosity, two faces may unite to form an eye with two irides, two lenses, and one globe ; in other forms the globe may be subdivided wholly or in part, and in all degrees, even to two slightly separated eyes. This cannot be explained by an arrest of development, as maintained by some authors, who state that at a certain stage of development every eye is cyclopean, being developed from a central cerebral vesicle ;—for, we find similar monstrosity in regard to the ear, and with the same modifications ; so there may be a single symmetrical median incisor tooth, as was the case in this very pig ; in like manner, the body may terminate in a single leg, with one, or two partially separated feet ; and a single median arm may project upwards between the shoulders of a double fœtus. These cases cannot be due to arrested development. Dr. Wyman's hypothesis is that a primary single vesicle is formed on the median line, instead of one on each side, as in the normal condition—this must remain a disputed point until some one is enabled to examine this class of monstrosities in their earliest stages.

Dr. Bacon exhibited a series of first class microscopic objectives, made by Mr. Grunow, of New Haven, Conn.; they embraced the most useful working powers, and in them allowance was made for the thickness of the glass covering the object. He explained the mechanism of the adjustments, and alluded to their wide angular aperture as of great importance, when not carried to excess, in bringing out the finer details of microscopic structure. Their power was tested on some very delicate photographs, diatoms, and other minute objects.

Dr. Durkee stated that a house at the south part of the city, occupied for several years by the same family, had been infested for the past year by mosquitoes; these pests were exceedingly numerous in the cellar, kitchen, and basement, but less so in the upper rooms, though the house was occupied by them from attic to cellar. He was at a loss to account for this singular visitation, as the cellar was dry, there was no cistern nor vessel of standing water on the premises, and other houses in the neighborhood were not similarly troubled. The family have been obliged to use mosquito bars for protection all winter, with the exception of about fifteen days in February. They were exceedingly annoying, invading even the sugar-bowl; and so numerous in a jug of molasses that there was taken out a large teacup full of them. He exhibited a nest of mosquito eggs preserved in fir balsam.

Mr. Stodder exhibited under the microscope a supposed new diatom of the genus *Tryblionella*, to which he gave the specific name *elliptica;* he obtained it from the Back Bay, Boston, where it is very common; he also showed finely executed drawings of the same.

On motion of Mr. J. M. Barnard, it was voted that

Prof. Agassiz be requested to prepare a sketch of the life and labors of the late Prof. Johannes Müller, of Berlin.

Dr. Kneeland presented to the Society, in the name of Wm. M. Wallace, Esq., of Winona, Minnesota, a living specimen of a snapping turtle, weighing 22 lbs., caught in the Mississippi River, near Winona. It was found to be identical with the *Chelydra serpentina.* The thanks of the Society were voted for this donation.

Mr. Samuel Woodward, of Boston, was elected a Resident Member of the Society.

June 16, 1858.

The President in the Chair.

Prof. Agassiz gave a short verbal sketch of the labors of the late Prof. Johannes Müller, of Berlin.

He was born about the year 1801; the particulars of his early life Prof. Agassiz was unable to give; he was thoroughly and unceasingly devoted to science, more so than any other man whose life belongs entirely to the nineteenth century; and the scientific world has met with no greater loss since the death of Cuvier. His works cover almost the whole domain of Comparative Anatomy, Physiology, and Zoölogy. His first researches were on the eyes of insects and the invertebrata generally; on the former subject he combated successfully the views of Strauss-Durckheim; he then devoted his attention to the microscopic structure and development of the glandular organs in the different animal types. He next published his great "Manual of Physiology," embracing a comprehensive view of the whole animal kingdom, and especially valuable for his observations on the senses and the cerebral functions. After this he devoted himself more especially to Zoölogy; beginning with a comparison of the sharks and skates with the myxinoid fishes; his monograph on the latter class is very minute and extensive, forming a sketch of the anatomy of the whole class of fishes. From fishes he turned his attention to echinoderms, more particularly to *pentacrinus* and the *asteroids*, assisted by Prof. Troschel; at the same time giving occasional isolated descriptions of fishes. He studied the embryonic growth of echinoderms and of fishes, with the most astonishing results; for these the Académie des Sciences of Paris awarded him the Cuvier prize three years ago. He made extensive observations on the vocal apparatus of birds, determining thus their affinities. Since 1834 he edited the Archives, or Journal of Comparative Anatomy and Physiology, himself writing an annual report on the progress of these sciences. The Transactions of the Berlin Academy are full of his elaborate papers. A few years since he suffered shipwreck, attended by the death of many of his beloved companions; his mind never recovered from the shock of that event, which no doubt contributed to his own early decease.

Prof. Agassiz said he hoped at some future time to present to the Society a sketch more extensive, and more worthy of this most eminent scientific man.

Dr. Bodichon, a French gentleman residing in Algeria, present by invitation, gave an account of the various races of men occupying Algeria, from personal observation.

There are two white races; one, living in the mountains, the Mauritanians, Numidians, or Berbers; and the Asiatics or Arabs. 1. Also called Kabyles, living in the mountains, small in stature, warlike, democratic, dwelling in villages resembling the Swiss, planting trees, enjoying plentiful harvests, fruits, &c.—very independent and noble in their sentiments; they have no judges, often settling their disputes by an appeal to the first person who passes by; though polygamous, they prefer a single wife; they are fine soldiers, and are not afraid of European troops. He considers these as an indigenous race, and the same as the brown inhabitants of Southern Europe. 2. The Arabs, a tall, brown race, excellent horsemen, nomadic, possessing no permanent villages; they are very fond of fighting, and pass at least half their time in war; they have a strong religious sentiment, and are very fond of poetry; they are polygamous. 3. A mixed race of Turks and women of the different races of the country, which has begun to disappear since the dominion of the French. 4. In the interior of Africa there is a race like the Germanic, with light hair and blue eyes, which he believes to be descendants of the ancient Gauls or Carthaginians; they are polygamous, and present the curious phenomenon that the women are sovereign in the family and in the state, though the daughter of the queen cannot inherit the throne; they make long pilgrimages on very swift camels for the purpose of carrying off negro slaves—they are called Tuariks. 5. A mixed white and black race, the Fellatah, embracing many millions; a powerful people, of very social disposition. 6. Negroes, from Congo, Timbuctoo, &c.; the best are from the neighborhood of Lake Tsad; they are idolaters, making sacrifices to their gods of sheep, cocks, and other animals, and drawing from them various auguries. They are subject to a kind of periodic insanity, like some of the New Orleans negroes, in which they call on the spirits of their ancestors, and often fall insensible. The characters of these different races are not perfectly distinct; especially of some of those communities which gather about a well or oasis in the desert, a few hundreds together, which they often wall around, and form into small villages. The Kabyles have well shaped heads; the Arabs have low, retreating foreheads. In answer to the question whether there exists in Africa any race of human beings with tails, Dr. B. replied that in the neighborhood of the Mountains of the Moon, there is said to be a large tribe of ferocious cannibals, having an elongated coccyx, projecting like a tail from three to ten inches; when seen by other tribes they are killed as if they were wild beasts—he had never seen any specimens, though it is generally believed that such a race exists.

Mr. J. M. Barnard exhibited a very perfect specimen of a rare echinoderm, *Acrocladia mammillata*, from the Sandwich Islands; the specimen had a broken spine in process of reparation, of a form generally supposed to belong to another genus. He remarked that he expected soon to have a complete collection of the animals of these islands.

Dr. Weinland proposed a new division of the five species of flying fish found along the coast of North America, which have hitherto all been referred to the genus *Exocetus*.

In the common species *E. exiliens*, the ventral fins are nearest to the anus, and the longest; the same is true of *E. noveboracensis*; in *E. furcatus*, and *E. comatus*, the ventrals are very long; in *E. mesogaster*, the ventrals are very short, about one fourth as long as the pectorals, and placed anterior to the middle of the body, between the anus and the pectorals; the shape of the lower jaw is also angular. He would arrange the species thus: *Exocetus exiliens*, and *E. noveboracensis*; *Cypselurus furcatus*, and *C. comatus*; for *mesogaster*, he would make a new genus *Halocypselus*. He thought that the flight of the *exoceti* was not a mere mechanical, parachute-like suspension of the body, but more nearly akin to the true flight of birds than has been generally supposed.

Prof. Agassiz described a new species of Skate from the Sandwich Islands, for which he proposed to constitute a new genus, under the name of *Goniobatis*.

He gave the distinguishing characters of *Myliobatis*, *Rhinoptera*, *Aëtobatis*, and *Zygobatis*, which he divided into two sub-families of *Myliobatinæ* and *Aëtobatinæ*. In the new genus *Goniobatis*, the palate is broadest behind, and the plates are obtusely angular, with their rounded edges forward. The *A. flagellum* of the Indian Ocean and Red Sea, with plates forming an acute angle, he would place in his new genus *Goniobatis*; and to the present species, with rounded nasal lobes, he proposed to give the name of *G. meleagris*.

Dr. Storer described and exhibited a drawing of a new species of *Zeus*.

He remarked that Valenciennes, in the 20th volume of his "*Histoire Naturelle des Poissons*," describes four species of this genus; two as being found along the Mediterranean coast, and one of these in the waters of Great Britain; a third at the Cape of Good Hope, and the fourth in Japan. No species has as yet been found upon the American coast. The specimen now described, was found at Provincetown, Mass., and is very dissimilar to either of the previously known species. Dr. Storer proposed for it the name of

ZEUS OCELLATUS.

Description—Body oval, very much compressed; cupreous, marked with numerous more or less circular dark spots; base of second dorsal fin longer than that of the first. A series of large bony plates, marked by well-defined elevated striæ, which terminate in recurved spines, standing out from the sides of the fish, extend along the base of the dorsal and anal fins to the abdomen and throat. Along the dorsal fin, seven of these are seen; the fifth and sixth of which are the largest; along the anal fin five, the fourth the largest; along the abdomen eight, which overlap each other—along the throat, four also overlapping each other. Length, 6 inches. The fin rays are as follows: D. 9.24; P. 12; V. 6; A. 3.24; C. 14. Found at Provincetown, Mass.

Dr. Abbot, chairman of the Committee appointed to nominate a candidate for the office of Recording Secretary, reported the name of Dr. S. Kneeland, Jr. The Society proceeded to ballot for Secretary, and made a unanimous choice of Dr. Kneeland.

Dr. Cabot presented, in the name of Mr. Emanuel Samuels, the following birds, all valuable, and some of them new to the Society's Cabinet: Black and Yellow Warbler, (*Mniotilta maculosa*, Gmel.) male and female; the female is not described nor figured. Blue-winged Yellow Warbler, (*M. solitaria*, Wils.) male; the only specimen known to have been procured in the State. Golden-winged Warbler, (*M. chrysoptera*, Linn.) male; the second specimen ever seen by Dr. Cabot from Massachusetts, and said to have been obtained from a flock. Blue Yellow-backed Warbler, (*M. Americana*, Linn.)

male and female. Hemlock Warbler, (*M. parus*, Wils.) male and female; spring plumage. Canada Flycatcher, (*Setophaga Canadensis*, Linn.) male. Yellow-bird, (*Fringilla tristis*, Linn.) Wilson's Thrush, (*Turdus Wilsonii*, Pr. Bonap.) female. The thanks of the Society were voted for this valuable donation.

The Corresponding Secretary read the following letters, viz:—

From the Leeds Philosophical and Literary Society, December 8, 1857; Société de Géographie, Paris, November 27, 1857; Linnæan Society, London, January 8, 1858, acknowledging the receipt of the Society's Publications. Société des Arts et des Sciences de Batavia, February 12, 1858; K. Bayerische Akademie, München, December 12, 1857; K. Preussische Akademie, Berlin, December 24, 1857, acknowledging the same, and asking that missing numbers may be supplied. K. Akademie der Wissenschaften, Wien, September 17, 1857; Real Academia de Ciencias de Madrid, August 18, 1856; Société d'Histoire Naturelle du Departement de la Moselle, January 4, 1858, presenting their various publications. Verein für Vaterländische Naturkunde, &c., Stuttgart, September 6, 1857; the same, December 28, 1857, presenting its publications, and acknowledging the receipt of those of this Society. Société Royale de Zoölogie, Amsterdam, November, 1857, proposing an exchange of publications. From H. Davis, Whitewater, Wisconsin, June 1 and 11, concerning specimens sent to the Society, &c.; Simeon Shurtleff, M. D., Westfield, Mass., June 9, accepting membership; Robert Howell, Nicholl, N. Y., June 4, proposing to exchange fossils for books; W. G. Binney, Burlington, N. J., June 11, concerning a paper on Helices.

The President announced the death of Dr. James Deane, of Greenfield, Mass., well known for his researches in fossil Ichnology. He was a Corresponding Member of the Society, and Mr. Bouvé was requested to draw up a sketch of his labors, and a series of resolutions expressing the Society's sense of their loss by his decease.

Thomas Gaffield, Esq., and Dr. J. H. Otis, of Boston, and Dr. Ira Russell, of Natick, Mass., were elected Resident Members.

DONATIONS TO THE MUSEUM.

April 21, 1858. Echinoderms, from Grand Manan; by Prof. Agassiz. A Tribolite, *Paradoxides Harlani?* from Braintree, showing the skin-markings of the under surface of the head; by Charles Stodder. A specimen of Coal, from nine miles below the Kanawha River, Va.; by Dr. A. A. Hayes. Lithia-mica, and Tourmalines in Mica, from Paris, Me.; by Dr. S. Kneeland, Jr. Dendritic Impressions in Clay Slate, from Jamaica Plain; by F. Balch. Two specimens of *Hyas coarctata*, from Halifax, N. S.; 2 specimens of *Melo*, from the Isle of Wight; 3 Echinoderms; by Dr. A. A. Gould.

May 5. A male specimen of the Black-masked Ruddy Duck, *Erismatura Dominica*, shot on the borders of Lake Champlain; and an European Widgeon, *Mareca penelope;* by Henry D. Morse. The brain of a Chimpanzée; by Dr. J. M. Warren.

May 19. Cranium of a Rhinoceros Hornbill, *Buceros rhinoceros;* by Charles B. Fessenden. Shells from Sandusky Bay, Lake Erie; by Samuel Tufts, Jr.

June 2. A Snapping Turtle, *Chelydra serpentina*, weighing 22 lbs., from the Mississippi River, in Minnesota; by William M. Wallace.

June 16. Larva, pupa, and perfect insect of the Apple-tree Borer, *Saperda bivittata;* by Theodore Lyman. 11 specimens of Massachusetts Birds; by E. Samuels.

BOOKS RECEIVED DURING THE QUARTER ENDING JUNE 30, 1858.

Edinburgh New Philosophical Journal. New series. Nos. 10, 13. 8vo. Edinburgh, 1852–8. *From Prof. H. D. Rogers.*

On some Modified Results attending the Decomposition of Bituminous Coals by Heat. 8vo. Pamph. By Dr. A. A. Hayes. *From the Author.*

First Supplement to Dana's Mineralogy. By the Author. 8vo. Pamph. 1858. *From the Author.*

Materia Medica, or Pharmacology and Therapeutics. By Wm. Tully, M. D. Vol. I. Parts 1, 2. 8vo. Springfield, 1857. *From J. N. Borland, M. D.*

Flora and Fauna of Williamstown, Mass. By P. A. Chadbourne. 8vo. Pamph. pp. 15. *From the Author.*

De Pollinis Orchidearum Genesi, &c. Auct. H. G. Reichenbach. 4to. Lipsiæ, 1851.

Flora Upsaliensis. A Geor. Wahlenberg. 8vo. Upsaliæ, 1820. *By Exchange with C. J. Sprague for Payer's Cryptogamic Botany.*

Report of the California State Agricultural Society's Fourth Annual Fair. 8vo. Pamph. San Francisco, 1858.

Hutching's California Magazine. Nos. 4, 5, 6. 8vo. Pamph. 1856. *From E. S. Holden.*

Ueber die Leuchtorgane von Lampyris. Von A. Kölliker. 8vo. Pamph. Also Untersuchungen zur vergleichenden Gewebelehre, angestellt in Nizza im Herbste. 1856. 8vo. Pamph. Von A. Kölliker.

Cyclostomatis Elegantis Anatomie. Auct. B. E. Claparede. 4to. Pamph. Berolini, 1857. *From the Heirs of Prof. J. W. Bailey.*

Report of the Superintendent of the Coast Survey. 4to. Washington, 1856.

Explorations and Surveys for a Railroad Route from Mississippi River to Pacific Ocean. 4to. Vol. VII. Washington, 1854–5.

Report on the United States and Mexican Boundary Survey. By Wm. E. Emory. 4to. Vol. I. Washington.

Reports on Standard Weights and Measures. Cong. Doc. 8vo. Washington, 1856. *From Hon. C. Sumner.*

Account of an Egyptian Mummy. By J. Blayds. 8vo. Pamph. Leeds, 1828.

Transactions of the Philosophical and Literary Society of Leeds. Vol. I. Part 1. 8vo. London, 1837.

Annual Report of the same for 1856–7. 8vo. Pamph. Leeds.

Guide to the Museum of the same. 8vo. Pamph. Leeds, 1854.

Report of the Proceedings of the Geological and Polytechnic Society of the West Riding of Yorkshire. 1856–7. 8vo. Pamph. Leeds.

Notice of Meetings of the Members of the Royal Institution of Great Britain. Part 7. 8vo. Pamph. London, 1857.

Silliman's Journal of Science and Arts. Vol. XXV. No. 75, for May, 1858.

Journal of the Geological Society of Dublin. Vol. VII. Part 5. 1857.

Archiv für Naturgeschichte. 2d and 3d parts. Berlin, 1857.

Transactions of the Linnean Society. Vol. XXII. Part 2. 4to. Also, Proceedings of the same, Botany, No. 4, Vol. I., Nos. 5, 6, Vol. II.; and Zoölogy, No. 4, Vol. I. and Nos. 5, 6, Vol. II. Also, Address of Thomas Bell, F. R. S., before the same Society. 8vo. Pamph. 1857. London.

Physikalische Abhandlungen der Königlichen Akademie der Wissenschaften zu Berlin. Aus dem Jahr, 1856. Also, Mathematische Abhandlung, &c. 1856. 4to. Berlin. Also, Monatsbericht der König. Preuss. Akad. der Wissenschaften zu Berlin. January to August, 1857. 8vo.

Würtembergische Naturwissenschaftliche Jahreshefte. Part 1. 1858. 8vo. Stuttgart.

Gelehrte Anzeigen. Akademie der Wissenschaften. XLIV. 4to. München, 1857.

New York Journal of Medicine. Vol. VI. No. 3. May, 1858.

Reccuil des Actes de l'Académie Impériale des Sciences, Belles Lettres, et Arts de Bordeaux. 4e Trimestre, 1856, 1er et 2e Trimestre. 8vo. Bordeaux, 1857.

Canadian Journal of Industry, Science, and Art. New series, No. 15. 8vo. Toronto. May, 1858.

Natural History Review. Vol. V. No. 1. January, 1858. London.

Proceedings of the Royal Geographical Society of London. No. 11, for June. 1857. London.

Proceedings of the Academy of Natural Sciences of Philadelphia. Vol. X. Sig. 7. April, 1858.

Transactions of the Academy of Science of St. Louis. 8vo. Pamph. 1858.

Canadian Naturalist and Geologist. Vol. III. No. 3, for June, 1858. Montreal.

Die Statischen Momente der Menschlichen Gliedmassen. Von Prof. Dr. E. Harless. 4to. Pamph. München, 1857.

Mittheilungen über Metallische Superoxyde von C. F. Schoenbein. 4to. Pamph. München, 1857.

Ueber das Verhalten des Bittermandelöles zum Sauerstoffe. Von C. F. Schoenbein. 4to. Pamph. München, 1857.

Ueber einige neue Reihen Chemischer Beruhrungswirkungen. Von C. F. Schoenbein. 4to. Pamph, München, 1856.

Neue Berträge zur Kentniss der Fossilen Saugthier-Ueberreste von Pikeomi. Von Dr. Andreas Wagner. 4to. Pamph. München, 1857.

Ueber Bleysesquiphosphat. Von Prof. Dr. A. Vogel, Jr., und Dr. G. C. Reischauer. 4to. Pamph. München, 1856.

De Mutationibus in Spectro Solari fixo. Elucubratio Prof. F. Zantedeschi. 4to. Pamph. München, 1857.

Resultate Meteorologischen Untersuchungen. Von Dr. J. Lamont. 4to. Pamph. München, 1857. *Received in Exchange.*

Quarterly Journal of the Geological Society. Vol. XIV. No. 54. 8vo. London, 1858.

Annals and Magazine of Natural History. Vol. I. No. 5, 3d series, for May; No. 6, June, 1858. *From the Courtis Fund.*

Oriental and Western Siberia. By T. W. Atkinson. 8vo. New York, 1858.

Explorations and Adventures in Honduras. By Wm. V. Wells. 8vo. New York, 1857.

History of the Constitution of the United States. By G. T. Curtis. Vol. I., II. 8vo. New York.

New Granada. By T. F. Holton. 8vo. New York, 1857.

History of the Republic of the United States of America. By J. C. Hamilton. Vol. II. 8vo. New York, 1858.

Mexico and its Religion. By R. A. Wilson. 12mo. New York, 1855.

Narrative of the Texan Santa Fé Expedition. By G. W. Kendall. 2 vols. 12mo. New York, 1856.

The Araucanians. By E. R. Smith. 12mo. New York, 1855.

Lake Ngami. By C. J. Anderson. 12mo. New York, 1857.

Western Africa. By Rev. J. L. Wilson. 12mo. New York, 1856.

Waikna, or Adventures on the Mosquito Shore. By S. A. Bard. 12mo. New York.

A Lady's Second Journey Round the World. By Ida Pfeiffer. 8vo. New York, 1856.

Life of Thomas Jefferson. By H. S. Randall. Vol. III. 8vo. New York, 1858.

Five Years' of a Hunter's Life in the Interior of South Africa. By R. G. Cumming. 12mo. New York, 1856. 2 vols.

History of the United States. By Geo. Bancroft. Vol. VII. 8vo. Boston, 1858.

Encyclopædia Britannica. Vol. XV. 4to. Boston. *Deposited by the Republican Institution.*

July 7, 1858.

The President in the Chair.

Mr. Bouvé read a sketch of the life and labors of the late Dr. James Deane, of Greenfield, a Corresponding Member, and presented a series of resolutions, which were unanimously adopted, as follows :—

Mr. President, and Fellow Members of the Society :—

It is my painful duty to lead your minds for a few brief moments, in our contemplation together of the character and services of our deceased friend and brother, Dr. James Deane. It becomes me as a personal friend,—knowing his worth, knowing his sacrifices for the good of the science he loved, knowing something at least of his spirit,—to speak of his manly virtues; and it becomes us all to ponder upon them, and to draw from them such lessons as they are calculated to teach; for certain it is, our endeavors for progress in the paths of science cannot but be strengthened,—our desires for greater usefulness enlarged, by the contemplation of his example.

The time and the occasion, however, will not permit me to otherwise than very briefly notice events in the life of our departed associate. It gives me, however, great pleasure to know that an abler pen than mine, that of one of our number, will soon fittingly commemorate his great worth, in a discourse to his fellow-citizens.

Dr. Deane, as I have been informed by a friend of his in Greenfield, to whom I am likewise indebted for other facts of his life, was born in Coleraine, Franklin County, in this State, in 1801. It does not appear that he received in youth other than a common-school education, and it is known that until 21 years of age he labored upon his father's farm. At this period of his life, moved undoubtedly by a desire to advance himself in knowledge and usefulness, he went to Greenfield, and there engaged himself in copying law papers and other documents, that he might raise means to enable him to study the science of medicine, to which his tastes inclined him. Subsequently, he entered the University of the State of New York, where he graduated as a Doctor of Medicine in 1831, being then about thirty years of age. He subsequently commenced the practice of his profession in Greenfield, and in this chosen sphere of his labors, he diligently and with great success served the sick and suffering of his fellow-citizens, until he himself was prostrated by the disease which, unfortunately for science and humanity, proved fatal.

Of his ability as a Doctor of Medicine, others present are far more competent to speak than myself; but I quote the language of one well acquainted with him, in the statement that "his success and skill were acknowledged in all the various branches of his profession, but were more especially conspicuous in operative surgery. In critical cases, it is said that his coolness and presence of mind were unsurpassed." "No man," says the same authority, "ever took a more genuine pleasure in the relief of human suffering; and being called to most of the difficult cases within a large circuit of miles, the readiness with which he yielded to the frequent demands upon him, was only equalled by the diligence and professional enthusiasm with which he prepared for his operations."

But it is in his character as a Naturalist that we members of the Society feel the most interest. None of us, I am sure, can be unmindful of his labors in working out and faithfully portraying the remarkable impressions of the rocks of the Connecticut valley, or of his yet more valuable and instructive observations upon these interesting mementos of past life. Whatever may be said of others who have honorably worked in the same field, this, I think, may be truly stated of Dr. Deane, that the first *scientific* observations upon the footprints were made by him.

Years have since passed,—yes, nearly a quarter of a century has gone by, since he first called attention to these impressions; but yet, though absorbed much in the duties of his profession, he never lost his interest in them. To his mind, nurtured as it had become by their study, questions of important moment depended upon their full elucidation, and certainly he exhibited an untiring devotion in his labors towards the accomplishment of this end.

We all know that he has for some time been engaged in the preparation of a work on the footprints of the Connecticut valley, now under publication by the Smithsonian Institution; and all are undoubtedly aware, that by a process of his own invention, he was able to lithograph and photograph them, so as to produce illustrations of singular fidelity,—the color, even, of the stone in which they occur being exactly represented. How far he had progressed towards the completion of the text for this work is not yet known to us. The plates, I have the satisfaction of announcing, are all finished.

Dr. Deane always felt a strong interest in our Society, and he was anxious that our cabinet should possess a full suite of the impressions. To him your committee were much indebted for advice and assistance in procuring such as adorn your cabinet. It is a satisfaction now to know, that he himself felt grateful to the Society for the readiness with which at all times, through your curator, it loaned him such specimens as were needed for the illustration of his work. These were always unhesitatingly placed at his disposal.

Dr. Deane was quiet and unobtrusive in his manners, and always presented his observations with singular modesty. It is indeed painful to reflect, that his manly form will never more come into our presence, or his instructive speech greet our hearing. He died on the night of the 8th of June, from typhoid fever, being about 57 years of age.

It is always a pleasure to know, that those whom we have respected for scientific attainments, were loved and honored in private life for their virtues. This pleasure we can fully enjoy in the case of our lamented associate. I cannot, perhaps, better close these remarks, than by quoting the language of the friend in Greenfield who kindly furnished me with some of the facts which I have mentioned. He says: "To the community here, his death is a loss not easily supplied. To many families, it is only second to that of an immediate member. We mourn not only the loss of our physician, and of a useful fellow-citizen, but of one who, by the daily beauty of his life, and by numberless unremembered acts of kindness, made personal friends of all those who were in the habit of associating with him."

In conclusion, I offer the following resolutions :—

Resolved, That the Boston Society of Natural History, highly appreciating the value and importance of the labors of the late Dr. James Deane, of Greenfield, in the investigation and elucidation of the fossil footprints of the Connecticut valley, recognize in his death a great loss, not only to themselves, with whom he was associated, but to all who feel interested in the progress of science.

Resolved, That this action of the Society be communicated to the family of the deceased, with the expression of our sympathy in their bereavement.

Mr. William W. Baker presented a fossil Starfish, from Lewiston, Me. It was found in a hill of earth, nearly ten feet below the surface, and about half a mile from the present river bed, about one hundred feet above its level, and two hundred feet above the sea, thirty miles distant. The hill was composed almost entirely of clay to the depth of eight feet; below this were thin layers of sand and gravel and clay alternating; there were numerous impressions of shell-fish. The specimen showed the under surface. Mr. Bouvé expressed the opinion that it was the same as the living species, and belonged to the post-pleiocene formation.

On motion of Mr. Bouvé, it was voted that there be a recess in the meetings of this Society until the first Wednesday in September.

Mr. Charles P. Lewis, of Boston, was elected a Resident Member.

September 1, 1858.

The President in the Chair.

The President made a communication on several parasites which he had found in the American Deer, *Cervus Virginianus.*

In the nasal passages he found an *Æstrus*, somewhat resembling that of the sheep ; possibly it may be a new species, as its body is longer and the spines are more scattered over the segments than in specimens he had examined from other animals. In the bronchial tubes he found a *Filaria*, or thread-worm. The eggs of this genus, as is well known, are laid in the ground, and the larvæ, if lucky enough to find a suitable animal nidus, as a grasshopper, enter it and are there developed into the immature state in which they are met with in insects ; how they get into mammals and reach their full development is not satisfactorily ascertained. In the liver were found *Distoma* and *Cysticercus*—some of the former were exhibited two inches long ; they are very common in adults, less so in yearlings, and so much so that hunters never eat the liver, taking it for granted that it contains these parasites ; their presence is indicated by the external appearance of the liver ; if mature they were contained, four or five in number, in a thick cyst ; the smaller ones were not inclosed in a cyst, but in the centre of a mass of softened and grumous blood, and seemed to be burrowing in search of a resting-place ; such traces of their wanderings were found in various parts of the organ. *Cysticerci* were found in several instances, of small size, but with the head largely developed ; it would be interesting to examine the catamount, which preys upon deer, to ascertain if tapeworms exist in their intestines. No *Tænia* was found in the deer, and *à priori* we should not expect to find it. The deer did not seem to be injuriously affected by any of these parasites. He had found *Filaria* in the heart of the porpoise and seal, always in the right cavities ; he thought it probable that they burrow into the portal vessels, and thence pass by the hepatic veins, and inferior cava to the right side of the heart, and do not gain access to the latter from the lungs, in which case they would be obliged to stem the torrent of the pulmonary artery.

Mr. Sprague presented two specimens of the glow-worm, obtained at Cohasset, Mass.; their light, which proceeded from the under surface of the tail, remained for fifteen minutes after death.

Dr. Kneeland presented some crustacean parasites from the skin of a sun-fish, *Orthagoriscus mola*, which he had obtained at Cohasset. A *Lernæa*, in large numbers, was attached around the dorsal and anal fins, its stem being plunged from one to two inches into the flesh; attached to these stems were numerous Cirripeds of the genus *Cineras*, and also several polyp growths. Other crustacean parasites, of the genus *Cecrops*, from the same fish were exhibited; the gills, intestines, and muscles are also generally infested with other species. The jaws of the fish, and also a piece of the remarkably elastic flesh, were presented. The specimens were referred to Dr. J. C. White to report upon.

A letter was read from Dr. Isaac I. Hayes to the President, announcing his intention of making another attempt to reach the North Pole of the earth; and asking for the influence of the Society in behalf of this object. The letter was accompanied by the report of the Academy of Natural Sciences of Philadelphia on the same letter. On motion of Prof. Parsons, the subject was referred to a Committee to be nominated by the President and reported on at the next meeting.

The President read a communication from Prof. Treadwell, of Cambridge, giving a detailed account of the feeding and growth of the American robin, (*Turdus migratorius*, Linn.) during a period of thirty-two days, commencing from the 5th of June.

When caught the two birds experimented on were quite young, their tail-feathers being less than an inch long, and the weight of each about twenty-five pennyweights, less than half the weight of the full-grown bird; both were plump and vigorous, and had evidently been very recently turned out of the nest. He began feeding them with earth-worms, giving three to each bird, that night; the 2d day he gave them ten worms each, which they eat ravenously; thinking this beyond what their parents could naturally supply them with, he limited them to this allowance. On the 3d day, he gave them eight worms each in the forenoon; but in the afternoon he found one becoming feeble, and it soon lost its strength, refused food, and died; on opening it, he found the crop, gizzard, and intestines entirely empty, and concluded therefore that it had died from want of sufficient food, the effect of hunger being perhaps increased by cold, as the thermometer was about 60°. The other bird, still vigorous, he put in a warmer place, and increased its food, giving it the 3d day fifteen worms, on the 4th day twenty-four, on the 5th twenty-five, on the 6th thirty, and on the 7th thirty-one worms. They seemed insufficient, and the bird appeared to be losing plumpness and weight; he began then to weigh both the bird and its food, and the results were given in a tabular form. On the 15th day he tried a small quantity of raw meat, and, finding it readily eaten, increased it gradually to the exclusion of worms; with it the bird eat a large quantity of earth and gravel, and drank freely after eating. By the table it appears that though the food was increased to forty worms, weighing twenty dwt. on the 11th day, the weight rather fell off; and it was not until the 14th day, when he eat sixty-eight worms, or thirty-four dwt., that he began to increase—on this day the weight of the bird was twenty-four dwt.; he therefore eat forty-one per cent. more than his own weight in twelve hours, weighing after it twenty-nine dwt., or fifteen per cent. less than the food he had eaten in that time; the length of these worms, if laid end to end, would be about fourteen feet, or ten times the length of the intestines. To meet the objection that the earth-worm contains but a small amount of solid nutritious matter, on the 27th day he was fed exclusively on clear beef, in quantity twenty-three dwt.; at night the bird weighed fifty-two dwt., but little more than twice the amount of flesh consumed during the day, not taking into account the water and earth swallowed. This presents a wonderful contrast with the amount of food required by the cold-blooded vertebrates, fishes and reptiles, many of which can live for months without food; and also with that required by mammalia—a man, at this rate, should eat about seventy lbs. of flesh a day, and drink five or six gallons of water. The question immediately presents itself, how can this immense amount of food, required by the young birds, be supplied by the parents? Suppose a pair of old robins with the usual number of four young ones—these would require, according to the consumption of this bird, two hundred and fifty worms, or their equivalent in insects or other food daily—suppose the parents to work ten hours, or six hundred minutes, to procure this supply; this would be a worm in every two and four-tenths minutes; or each parent must procure a worm or its equivalent, in less than five minutes during ten hours, in addition to the food required for its own support. He was unable to reconcile this calculation with actual observation of robins, which he had never seen return to their nests oftener than once in ten minutes. After the 32d day the bird had attained its full size, and was entrusted to the care of another person during his own absence of eighteen days; at the end of that period the bird was strong and healthy, with no increase of weight, though its feathers had grown longer and smoother. Its food had been weighed daily, and averaged fifteen dwt. of meat, two or three earth-worms, and a small quantity of bread each day; the whole being equal to eighteen dwt. of beef, or thirty-six dwt. of earth-worms; and it has continued to eat this amount to the present time. The bird having continued, in its confinement, with certainly much less exercise than in the wild state, to eat one-third of its weight of clear flesh daily, he concludes that the food it consumed when young was not much more than must always be provided by the parents of wild birds. The food was never passed undigested; the excretions were made up of gravel and dirt, and a small quantity of white semi-solid urine.

He thought that every admirer of trees may derive from these facts a lesson, showing the immense power of birds to destroy the insects by which our trees, especially our apples, elms, and lindens, are every few years stripped of their foliage, and, often many of them killed. The food of the robin, while with us, consists principally of earth-worms, various insects, their larvæ and eggs, and a few cherries; of worms and cherries they can procure but few, and those during but a short period, and they are obliged therefore to subsist principally upon the great destroyers of leaves, canker-worms, and some other kinds of caterpillars and bugs. If each robin, old and young, requires for its support an amount of these equal to the weight consumed by his bird, it is easy to see what a prodigious havoc a few hundreds of them must make upon the insects of an orchard or a park. Is it not then to our advantage, he asks, to purchase the service of the robins at the price of a few cherries? There has lately been some improvement in preserving our birds, and with a little more protection, he thinks that such an increase of them might be obtained as would save us from all the labor required for the appliances of tar, oil, zinc plates, and all other methods by which we seek, with very imperfect success, to destroy our mischievous insects.

The thanks of the Society were voted to Prof. Treadwell for his communication.

An animated discussion took place on the use of birds, and especially of the robin, in destroying insects.

Prof. Parsons did not believe that the robin ever devours the canker-worm, and his observation had not convinced him that any bird does; he was also of opinion that man destroys few birds in comparison with cats and their other natural enemies; he alluded to an opinion of the late Dr. Harris, of Cambridge, that insects perish from the attacks of their own parasites, the latter growing the more numerous whenever the necessity arises.

Mr. Wetherel observed, that the robin eats caterpillars, but whether canker-worms or not he did not know; insects injurious to fruit and to grasses have also been found in its crop; he believed the squirrels, introduced on Boston Common and other public and private enclosures, are the worst foes of the insectivorous birds by destroying their eggs; he considered also the crow one of the farmers' best friends, though he does pull up a few roots of the young corn, by his destruction of grubs and insects injurious to vegetation.

Dr. White remarked, that he had seen birds of the genus *Vireo* eagerly devouring canker-worms.

Dr. C. T. Jackson observed, that it was the opinion of Mr. Townend Glover, now engaged by the U. S. Patent Office in studying the insects injurious to cotton and other American crops, that among the most inveterate foes to noxious insects are insectivorous insects themselves.

September 15, 1858.

The President in the Chair.

The President said it was his painful duty to announce the death of a valued Corresponding Member of the Society, Dr. Francis W. Cragin. Dr. Cragin was for many years a resident in Parimaribo, Surinam, where he practised the profession of Medicine, and was highly respected as the most accomplished physician and surgeon in the colony. He was also for many years the United States consular agent in Dutch Guiana.

It was not, however, in connection with his professional reputation, or as the consular agent of our government that he becomes the subject of a notice before this Society. An examination of our records shows that for many years he was one of our most generous benefactors, and that from him we have received a large number of donations of great zoölogical and anatomical interest. Those who are aware of the circumstances under which they were collected in a tropical country, and of the expenditure of means which they involved, will feel that the Society is under no ordinary obligations to him for his benefactions. Though not professedly a naturalist, he was an ardent lover and keen observer of nature, and it was in consequence of these elements of his character, as well as from a wholly disinterested impulse to advance the cause of natural science, that he became so liberal a contributor to our own and other collections.

He offered the following resolutions, which were unanimously adopted:—

Resolved, That the members of the Boston Society of Natural History have learned with deep regret the death of their late associate, Dr. Francis W. Cragin.

Resolved, That in his death the Society has lost one of its most generous friends and benefactors.

Resolved, That to the family of our late associate we offer our sympathies in the affliction they have been called upon to meet.

A letter was read from Mr. William Sharswood, of Philadelphia, accompanying the following descriptions of insects by Prof. S. S. Haldeman, which have been printed in certain popular journals, but have never appeared in a scientific publication.

CECIDOMYA ROBINIÆ. Hald.

Aurantiaca, alæ pallidé obscuræ; thorax maculis 3 longitudinalibus obscuris, pleura maculâ obscurâ; abdomen segmentis 1° 2° obscuris. Long 1½ lin.

Pale orange; orange black, reticulate; antennæ, front, wings, a large macula upon the pleura below the wing, and another between the anterior and medial feet, dusky: antennæ (♀) 14-articulate, verticillate, slender, articulations separated, scapus rather thick, and with the pedicellum translucent; ♂ about 24-articulate, slender; palpi slender cylindric, 3-articulate, terminal articulation more slender and larger than the preceding ones: thorax with three large oval conspicuous dusky vittæ: abdomen 9-articulate, two basal articulations dusky above.

This insect in the larva state feeds upon the leaves of the *Robinia pseudacacia*, the margin of which it forms into a roll. The larva is white, or pale orange, of 13 segments, the first of which receives the retractile head; nine segments, from the fourth to the twelfth inclusive, with spiracles. The pupa does not form a cocoon, but lies without a covering. It can move itself by means of the abdomen. The insect is not strictly a Cecidomya, the posterior vein of the wing being interrupted, the basal portion sending a deflected filament (which does not seem to be hollow) to the middle of the posterior margin. The disrupted parts of the posterior vein pass and run parallel to each other for a short distance, the apical portion being the more anterior.

Two species of minute parasitic Hymenoptera destroy a great many individuals of this insect, which, in conjunction with *Odonta scutellaris*, Oliv., has for several years killed the foliage of Robinia in southeastern Pennsylvania, so that the trees present the appearance of having been destroyed by dry weather, the brown leaves remaining upon the tree. This happens chiefly in August.

ERIOPHILUS. Hald.

The new generic name (meaning *wool-loving*) is given in allusion to *Eriosoma*, upon which this insect is parasitic; and the trivial name *mali* has reference to the apple-tree, upon which it is found.

Observing the dead and black specimens of Eriosoma, with the body plump, but hollow, and a small perforation posteriorly, we examined other individuals without the perforation, and found them to contain the naked pupa of a minute hymenopterous insect, which, before it left the larva state, must have bored through the belly of the Eriosoma and affixed it to the branch.

This insect belongs to the family of *Chalcididæ*, and has the following *generic characters* :—

Head free, transverse, eyes large, and set with short stiff hairs; antennæ with short pile, elbowed, with *six articulations*, the first long (in the *male*), the second subconical, the third and fourth short and equal, the fifth subcylindrical, and the sixth fusiform; in the female the flagellum is fusiform, the second and fifth joints short, and the wings ample, the anterior one with the *subcostal vein straight, the stigmal branch very short*, and difficult to distinguish; basal portion of the disk without pile, anterior and exterior margin short ciliate; posterior wing ciliate with long hairs. Feet slender, pentamerous, adapted for leaping; medial *tibial spine* long, anterior one *curved.* Abdomen sessile, and rather long, having a sharp slender exsertile sting or ovipositor in the female. Pupa without a follicle.

E. mali. Length one twenty-fifth of an inch, expanse of the wings about twice this amount. Body shining black, with a few hairs; front vertically impressed upon each side of the middle for the antennæ, *eyes violet*, scabrous, short pilose; *antennæ* (except the first and base of the second joint) *white. Wings* with two straight lines of pile running at an acute angle from the end of the subcostal vein across the disk, which is densely pilose exterior to them. Base of the *abdomen yellow*, followed above by several indistinct brownish transverse bands. *Anterior feet white*, the femora (except the apex) *black; medial femora black*, base and apex *white*, tibiæ *black*, with the apex and the *tarsi white. Posterior femora* and *tarsi* (except the base) *white.*

Leaps with agility. The genus seems to have some affinity with Agonioneurus.

APHIS (PEMPHIGUS) STAMINEUS. Hald.

This name is proposed for a large species of Aphis, which forms follicles on the leaves of the silver-leaved maple, *(Acer eriocarpum.)*

Male.—Black, feet long, slender, and rufous; tarsi bi-articulate; wings slightly deflexed, translucent, pale ferruginous at the base, submarginal nervure conspicuous, black, and ending in a long stigma; disk with four simple nervures; posterior wings with three nervures; mesonotum polished, with a deep Y-shaped impression; abdomen without tubes; promuscis obsolete, antennæ 6-articulate, the first two short, the third long, and the fourth, fifth, and sixth gradually lengthening; length of the body, 1½ line; or to the end of the wings, 2½.

Female and pupa.—Apterous, dark-reddish brown, feet paler; promuscis twice as long as the head, thickened near the apex; length, 1½ lines.

Dr. Gould observed, in relation to the food of the robin, which had been spoken of at the preceding meeting, that experiments, conducted since midwinter, show that its crop is found full of insects at night; as many as 500 have been found in a single bird. It is difficult to understand how they get such a full supply in cold weather.

Mr. C. J. Sprague, exhibited a castor bottle containing red pepper, which was completely riddled by the grubs and perfect insects of a little beetle, apparently the same as he had formerly found committing its ravages among the plants of the Society's herbarium. It was *Ptinus fur*, according to Dr. Pickering.

Dr. J. C. White read a report on the parasites of the *Orthagoriscus mola* (Sun-fish), referred to him at the last meeting. They consisted principally of female specimens of *Pennella filosa*. Dr. White gave an account of some interesting points in their structure. Attached to the *Pennellæ* were numbers of *Cineras vittata*. Attached to the bodies of the *Cineras* and to the ovaries of the *Pennella* were numerous polyp stems, the *Laomedea gelatinosa*.

On the skin of the same fish were other crustacean parasites, usually called "fish-lice," the *Cecrops Latreilli*.

The tissue of the sun-fish, which is so elastic as to rebound to a considerable height when thrown upon the ground, was found by Dr. White, on microscopic examination, to consist almost wholly of yellow elastic fibre, interlaced in an intricate manner, and presenting no appearance of true muscle. There may be a little white fibrous tissue intermixed, but the alcohol had so interfered with the action of reagents as to render its detection uncertain.

Dr. Gould spoke of the great difficulty which he had recently found to exist in Europe in obtaining American works on Natural History, although they are eagerly sought for, especially in Germany. He alluded to the high prices charged for American books by the interference of foreign booksellers, and mentioned one, the cost of which in America was $4, and in Europe $24.

The President nominated as a Committee on the subject of Dr. Hayes's proposed Arctic Expedition, Prof. Theophilus Parsons, and Drs. A. A. Gould and S. Kneeland, Jr., and they were chosen.

Jules Marcou, of Zurich, Switzerland, was chosen a Corresponding Member; and Dr. Daniel V. Folts, of East Boston, and Thomas Motley, Jr., of West Roxbury, Resident Members.

DONATIONS TO THE MUSEUM.

July 7, 1858. A fossil *Asterias* from Lewiston, Me.; by William W. Baker. A Scup, *Pagrus argyrops*, Linn., from Lynn, Mass.; by Zaccheus Phillips. A young Gopher, *Spermophilus tredecimlineatus*, Mitch., and a specimen of Crystallized Iron Ore, from Minnesota; by Dr. S. Kneeland, Jr.

September 1. A Trilobite, *Paradoxides Harlani*, nearly perfect, from Braintree; and a specimen of rock containing native gold, from the Steele Mine, Montgomery Co., North Carolina; by Dr. C. T. Jackson. Two specimens of the Glow-Worm, from Cohasset; by Charles J. Sprague. Specimens of Crustacean Parasites from the Sun-Fish, *Orthagoriscus mola*, the jaws, and a portion of the flesh, from Cohasset; by Dr. S. Kneeland, Jr. Shells from Sweden, fossils from Maine, and alcoholic specimens of the internal organs of birds, and some Cirripeds; by Dr. S. Cabot, Jr.

September 15. European Shells, and a large Beetle; by Dr. D. F. Weinland. Internal moulds of *Arca*, and a fragment of fossil bone, probably cetacean, from New Jersey; by Charles K. Landis. A portion of rock containing Encrinites and fossil shells from Sharon Springs, N. Y.; by C. B. Fairbanks. Specimens of *Ophiura*, taken from cods' stomachs, and crustacean parasites from their gills; by Dr. S. Kneeland, Jr. Specimens of *Motella*, from Nahant; by C. Cooke. Three specimens of *Eleotris* (nov. sp.), one of *Vomer Brownii*, one of *Hæmulon formosum*, and four of *Clupea*, from Hayti, and one of *Petromyzon fluviatilis*, from Berlin; by Dr. D. F. Weinland. Specimens of *Fundulus pisculentus*, *Hydrargyra flavula*, *Cyprinodon variegatus*, *Pœcilia latipinna*, and *Heterandra Holbrookii*; by Prof. Holbrook, of Charleston, S. C.

BOOKS RECEIVED DURING THE QUARTER ENDING SEPT. 30, 1858.

Prodromus Descriptionis Animalium Evertebratorum. Auct. W. Stimpson. Parts V., VI. 8vo. Pamph. Philadelphia, 1858. *From the Author.*

Experiments on Sonorous Flames, with Remarks on the primary Source of their Vibration. By Prof. W. B. Rogers. 8vo. Pamph. New Haven. *From the Author.*

Essay on the Tapeworms of Man. By D. F. Weinland, P. D. 8vo. Pamph. Cambridge, 1858. *From the Author.*

Reports on Railway and Electro-Magnetic Telegraph from Quebec to Halifax. 8vo. Pamph. Fredericton, 1847. *From M. H. Perley.*

Notes pour servir à une description Geologique des Montagnes Rocheuses. Par J. Marcou. 12mo. Pamph. Genève, 1858. *From the Author.*

The Dudley Observatory and Scientific Council. Statement of the Trustees. 8vo. Pamph. Albany, 1858. *From the Trustees.*

Notes on American Land Shells. By W. G. Binney. No. 3. 8vo. Pamph. Philadelphia, 1858. *From the Author.*

London Geological Jonrnal. Nos. 1, 2, 3. 8vo. London, 1846–7. 3 copies. *From E. Charlesworth, F. G. S.*

Natural History Review. Vol. V., No. 2. 8vo. London, 1858.

Zeitschrift für die Gesammten Naturwissenschaften. Jahrgang, 1857. Zehnter Band. 8vo. Berlin.

Canadian Journal of Industry, Science, and Art. No. 16. July. 1858. Toronto.

Bulletin de la Société de Geographie. Tome XV. 8vo. Paris, 1858.

Jahrbuch der K. K. Geologischen Reichsanstalt. Vols. 1–3 and 5–8. 8vo. Wien, 1850–58.

Malakozoölogische Blätter. V Band 1–2. Bog. 6 Taf.

Genera of Recent Mollusca. By H. and A. Adams. No. 34. London, 1858.

Conchological Miscellany. By S. Hanley. Parts 3–10. 4to. London.

Sowerby's Thesaurus Conchyliorum. Part 18. London.

Proceedings of Zoölogical Society of London. Part 25, for 1857. 8vo. London.

New York Journal of Medicine. Vol. V., No. 2, for September, 1858.

Archiv für Naturgeschichte. Drei-und-Zwanzigster Jahrgang. Viertes Heft. 8vo. Pamph. Berlin, 1857.

Proceedings of the Royal Geographical Society of London. Vol. 2. Nos. 1, 2. 8vo. London, 1858.

Journal of the Royal Geographical Society. Vol. 27. 8vo. London, 1857.

Silliman's American Journal of Science and Arts. No. 77, for September, 1858.

Canadian Naturalist and Geologist. Vol. 3, No. 4. Montreal, 1858.

Proceedings of American Philosophical Society. Vol. VI., No. 59. January to June, 1858.

New York Journal of Medicine. Vol. VI., No. 1. July, 1858.

Canadian Journal of Industry, Science, and Art. New Series. No. 17. Sept. 1858.

Württembergische Naturwissenschaftliche Jahreshefte. Dreizehnter Jahrgang. Drittes Heft. 8vo. Pamph. Stuttgart, 1857.

Silliman's American Journal of Science and Arts. 2d Series. No. 76, for July, 1858. *Received in Exchange.*

Annals and Magazine of Natural History. No. 7, Vol. 2. July, 1858. London.

Quarterly Journal of the Geological Society. No. 55. Aug. 1858. 8vo. London.

Cyclopædia of Anatomy and Physiology. By R. B. Todd, M. D., F. R. S. Parts 49 and 50. 8vo. London.

Annals and Magazine of Natural History. Vol. 2, No. 8, for August, 1858. London. *From the Courtis Fund.*

Encyclopædia Britannica. Vol. XVI.
Memoirs of the Life of John Quincy Adams. By Josiah Quincy, LL. D. 8vo. Boston, 1858. *Deposited by the Republican Institution.*

October 6, 1858.

Dr. C. T. Jackson in the Chair.

Prof. Agassiz, as an introduction to the description of some new fishes from Lake Nicaragua, made some remarks on classification.

He observed that as yet there is no natural ichthyological system. The three principal ones which have attracted the attention of naturalists are the following, in chronological order. 1. That of Cuvier, remarkable for its precise divisions into natural families, founded on the consistence of the skeleton, and on the characters and situations of the fins. 2. His own system, based on the structure of the scales; this, though placing too great stress on external characters, led to the discovery of many interesting affinities between the scales and the internal organs. 3. That of Johannes Müller, deriving the characters from purely anatomical structure, leading to combinations without regard to zoölogical differences. The fault of all these systems is their exclusiveness, attaching too great value to single characters. He thought a combination of the three systems would lead to a better appreciation of certain groups. The Nicaraguan fishes, collected by Julius Froebel, are representatives of four genera of a single family, foreign to North America; though much resembling *Pomotis*, they belong to the family of *Chromids*.

In the family of *Labroids*, in which the *Chromids* were formerly included, the last pharyngeal bones are united into a single odd bone, without trace of suture—there is no fissure between the fourth and fifth branchial arches; the last gill is imperfectly developed; the scales are cycloid, and the tubes of the lateral line branching. Heckel separated the genera *Cichla* and *Chromis*, and with the *Sciænoids* having less than seven branchiostegal rays, formed a distinct family, the *Chromids*. Müller found that the first of these differed from the latter, which have no suture in the last pharyngeal bone, and pseudobranchia on the inner surface of the operculum; he called the latter *Pomacentrini;* for the former he retained the name *Chromids*, uniting them, however, under the name of *Pharyngognathi*, and including with them the genera *Belone*, *Scomberesox*, and *Exocetus*, but which really are in no way allied to the *Labroids*, *Pomacentrini*, and *Chromids*.

Every Labroid is a marine fish; all the Chromids are inhabitants of fresh water, and peculiar to South and Central America, except one species in the Nile, and one in South Africa. Of the four genera from Nicaragua, one, were it not for the interrupted lateral line, would resemble very closely *Dentex;* Prof. Agassiz proposed to call it *Parachromis gulosus*. A second, resembling *Chrysophrys*, he called *Hypsophrys unimaculatus*. A third resembling *Boöps*, he named *Baiodon fasciatus*. The last he called *Amphilophus Froebelii*, which is peculiar in not having the ordinary fleshy lips, but a large triangular lobe projecting above the upper and below the lower jaw, like the nasal appendages of some bats.

Though the form of these Chromids varies from the elongated shape of the Pickerel to the roundness of the Bream, there is one character common to all—the second dorsal fin and the anal are pointed backward, extending over the caudal. Though coming from the same lake, and belonging to the same family, the distribution of the colors varies considerably; yet it is derived from one pattern. Prof. A. showed how from the simple vertical bands of the sides, a longitudinal line was formed by the increase and union of the color in the centre of the bands, and its fading above and below; and how in the *H. unimaculatus* a single spot was developed to the exclusion of the rest.

Dr. C. T. Jackson exhibited some fine samples of tobacco, *Nicotiana tabacum*, raised in the Connecticut valley, at Hatfield, Mass., by Mr. Dickinson. On drying it, the specimens were found to lose 88 per cent. of their weight; on being burned, the stems decrepitate, indicating the presence of nitre; the main stalks decay rapidly and form an excellent manure; it is an exhausting crop, and requires rotation with others. As much as 2500 lbs. of the dried tobacco, worth between $400 and $500, have been raised to the acre. The leaves are thin, smooth, and wide, and are largely exported to Havana for the covers of cigars.

Dr. A. A. Gould gave an account of a recent visit to some of the scientific institutions of Europe, confining his remarks to Great Britain.

Mr. Charles T. Carney made the following communication:—

"In September, 1857, I was led to investigate the Sesquioxide of Chromium, with a view of decomposing the same without injury to any organic matter which might be present with it. The means usually employed for effecting the decomposition, by boiling sulphuric acid, &c. were of course unavailable, and I was much interested in observing a peculiar reaction which was new to me; and I do not know that it has been before observed. I found that when the ignited sesquioxide was exposed to the action of the galvanic battery, in presence of a dilute solution of caustic alkali, it was decomposed, and the chromate of alkali formed in solution. Thinking it possible that a combination might occur with the caustic alkali and some soluble portion of the chrome oxide, I next subjected some freshly prepared and ignited sesquioxide to the action of caustic alkali for twelve hours; then after being thoroughly washed and dried, submitted it to the action of the battery. The result was the same, and from the solution of chromate of alkali obtained, I formed the chromic salts of lead and silver."

Stephen P. Leeds, of Brooklyn, N. Y., was chosen a Corresponding Member.

Octavius Pickering, of Cambridge, and Dr. C. F. Winslow, of West Newton, were chosen Resident Members.

October 20, 1858.

Dr. Durkee in the Chair.

Dr. A. A. Gould continued his remarks on the European collections of Natural History, giving brief sketches of those of Paris, Florence, Vienna, Munich, Bonn, Amsterdam, Leyden, and Glasgow.

Mr. Theodore Lyman read a paper on the forms of birds, the object of which was to show how form, as depending on structure, may be recognized in this class, and may be expressed by measurements. He had compared, for this purpose, a hawk and an owl, and a duck and an auk, showing that the form is characteristic in each group, which may therefore be looked upon as a natural family in the animal kingdom. There is no essential difference between the bill and claws of the hawk and owl; there are, however, very striking differences in the size and position of the eyes, the bulk of the lower body, and in the length of the tarsus. Owls have large, prominent eyes, turned to the front, a body bulky below, and (generally) a very short tarsus; their abundant plumage is so arranged as to bring out these features; the feathers of the head make a kind of face, in the midst of which appear a half-buried beak and a pair of round, staring eyes; the body is large and heavy looking, growing larger below, and apparently ending in a partly concealed pair of feet; the natural position is bolt upright, on account of the short tarsi and the weight of the body in front. Hawks have eyes of moderate size, rather sunken, and on the sides of the head; the body is elegant and compact, and the tarsus generally long; the plumage is commonly shorter and closer; the ordinary position is with the body standing well up on the legs, and inclined at a small angle from vertical. The owl gives the idea of solemnity and gravity, the hawk that of alertness and vigor, but both share the expression of ferocity.

In the auks and ducks, both water-birds, the chief elements of difference are the plane of the bill with reference to that of the head, the shape of the body, and the position of the legs. The ducks have the bill flattened in a horizontal and the head in a vertical plane, and the legs placed so far forward that they can move, though awkwardly, on land; the neck is long and slender, and the body short and chubby. The auks have the head compressed in a horizontal and the bill in a vertical plane; the body is very long and flattened vertically; the legs are entirely behind, and the tibia is so bound down by the integuments, that the animal, on land, often tumbles forward, and assumes when standing an upright position.

The paper was accompanied by drawings, and by tables giving the proportions of the skulls and skeletons, and showing the characters of the families.

Prof. Agassiz made some remarks on two *Pomocentridæ* from the Florida reefs, of the genera *Glyphisodon* and *Pomacentrus*, the latter being a new species called by him *P. meleagris.*

The family of *Discoboli,* of which the Lump-fish is the chief representative, is very interesting both anatomically and zoölogically. Swainson arranged the lump-fish with the lamprey-eel, which is as bad as placing the bat among the birds. Cuvier placed it with the malacopterygians, with the *Gadidæ* and *Pleuronectidæ.* J. Müller separated the *Discoboli* from malacopterygians, and placed them with the acanthopterygians, where they belong; but from the fact that the ventrals are united into a disk, he erroneously placed them in a family *Cyclopodi*, with *Gobius,* separating *Eleotris* from the family. The genus *Echeneis,* according to Prof. Agassiz, belongs among the scomberoids. He gave some of the characters of the genera *Cyclopterus, Liparis, Gobiesox,* and *Lepadogaster,* of the family *Discoboli;*—in *Lepadogaster* there are two pairs of pectorals and two pairs of ventrals, one pair of which consist each of folds of skin only, and are not true fins; the membranous fold of the second pectorals contains fibrous rays, and is attached to the shoulder bone, the membranous ventral fold is attached to the styloid bone. These structural features render a separation of *Lepadogaster* and *Cyclopterus* as distinct families necessary. He would place the *Discoboli* not at all with *Gobius*, but in the neighborhood of the sculpins. He presented to the Society specimens of three new genera of this family, as follows: *Crossognathus*, Ag., from Charleston, S. Carolina; *Lobognathus*, Ag., from Peru; and *Ptychocheilus*, Ag., from Puget Sound.

The following communication was received from Mr. William Stimpson:—

Smithsonian Institution, Washington, D. C., Oct. 1, 1858.

I wish to place on record in the Proceedings of the Society the existence of a remarkable new form of Brachyurous Crustacean on the coral reefs at Hawaii. It cannot be properly referred to any known family, although having perhaps more resemblance to *Pinnotheres* than any other known genus, as its integuments are soft, and the female abdomen of great size,—in fact larger than the carapax. Its place in the series is probably between *Pinnotheres* and *Hymenosoma*. Four specimens only are in my possession, which are, unfortunately, all females. They were collected by the scientific corps of the U. S. North Pacific Surveying Expedition, under the command of Capt. John Rodgers. It may be called

HAPALOCARCINUS MARSUPIALIS.

The shell or general integument of the body is but little indurated, quite soft and flexible, such as occurs after moulting in other crabs. The feet however, particularly the chelipeds, are sufficiently firm. The carapax is rather depressed, smooth, and glabrous, suboval, longer than broad, narrower in front than behind, somewhat truncated at either extremity, and without teeth or spines on any part. Front horizontal, straight. Orbits small, excavated in the anterior margin. Eyes short, oblique, inclining to longitudinal, and scarcely retractile. Antennulæ very short and minute, placed at the inner angle of the orbit. The epistome is scarcely distinct, as the lamelliform maxillipeds reach nearly to the eyes and antennæ. The buccal area occupies the whole breadth of the carapax anteriorly, the outer maxillipeds covering the subhepatic regions. The maxillipeds are loosely applied, as in some *Anomoura*, and those of the two sides are separated from each other at the base by the triangular anterior extremity of the sternum, which is greatly prolonged. In the outer maxillipeds the ischium-joint is enlarged and dilated within, while the meros is very small, and slender like the last three joints or palpus; the exognath is slender and palpigerous.

The feet are slender and weak, smooth and shaped nearly as in *Pinnotheres.* The chelipeds are equal, and about as long as the ambulatory feet, and twice as thick. Fingers of the hand nearly straight, longitudinal, and shorter than the palm. Dactyli of the ambulatory feet all very short, and slightly uncinate. Sternum very broad and smooth, with the genital orifices rather wide apart. Abdomen of great size, larger than the rest of the animal, smooth, but with the segments distinct; the sides much expanded and folded inward, forming a kind of pouch for the reception of the eggs.

Color a dark blue-gray, or "neutral tint." Length of the carapax, 0.21; breadth, 0.165 inch.

Found clinging to the branches of living madrepores, at the depth of one fathom, in the harbor of Hilo, Hawaii, March, 1856. They probably feed upon the coral-polypes.

The Corresponding Secretary read the following letters, which had been recently received, viz:—

From the Smithsonian Institution, June 23; the Royal Society of London, March 13; the Lyceum of Natural History of New York, February 11, acknowledging the receipt of the Society's publications; from Charles Loosey, New York, August 19; the Royal Geographical Society, April 20, presenting various publications; from William Sharswood, Philadelphia, accompanying descriptions of insects; the same, August 26, proposing an exchange of publications with the Entomologischer Verein zu Stettin; the Société du Museum d'Histoire Naturelle de Strasbourg, March 1, 1857, proposing an exchange of publications.

Joseph Hyrtl, of Vienna, was elected an Honorary Member of the Society. W. G. Binney, of Burlington, N. J., and E. S. Morse, of Portland, Me., were elected Corresponding Members. Dr. Richard H. Wheatland, of Salem, was chosen a Resident Member.

November 3, 1858.

The President in the Chair.

Dr. C. F. Winslow read a paper on certain facts bearing upon the coincident origin of the inhabitants of the Society and Sandwich islands; it related principally to the custom of burying the placenta deep in the ground as near as possible to the spot where a child is born, with the idea of securing for the child a perpetual inheritance in the earth, an indisputable right to the soil, and an equality with other men. He had traced this custom in both the above groups of islands, far removed from each other, and thought it would be interesting to trace it, if possible, among the Malays, from whom the Polynesians are generally supposed to have originated.

Mr. T. T. Bouvé exhibited a thin, white, paper-like substance, found stretched over a quantity of meal contained in a box, in which a large number of grubs were concealed.

Prof. Agassiz made some remarks on a catalogue of the fishes of Jamaica, by the Hon. Richard Hill, of Kingston.

He regarded it as interesting for purposes of comparison with the species of North America and Europe. It is well known that the fishes of the two sides of the Atlantic are specifically distinct, except a few northern ones, which are identical, not from crossing from one continent to another, but from migrating southward on both shores from the same arctic centre. As maps are usually drawn, the average temperature of the water for the year is taken as regulating the geographical distribution of fishes; but, as Prof. Dana has shown in his report on the Crustacea of the U. S. Exploring Expedition, the average of the greatest cold has a more important influence in this distribution. From the Arctic, Gulf-stream, and African currents, the modification of the zones of temperature in the Atlantic is very striking—for instance, the temperate zone on the American side extends only from Cape Hatteras to Cape Cod, about ten degrees of latitude, while on the European it extends from the coast of Sweden to the Cape de Verd Islands, nearly five times as many degrees—on the contrary, the tropical zone, which extends in America from Cape Hatteras to 25° S. latitude, or sixty degrees, extends only about twenty degrees on the African Guinea coast. The line of temperature established by the average of the thirty coldest days in the year, gives the clue to the distribution of the marine fauna; in America this is essentially tropical, and in Europe essentially temperate.

Of the families mentioned in this list, the *Cottoids* are essentially North American, and ther eare five in Jamaica; the *Sciænoids* are tropical, Europe having but a few; the *Sparoids* are essentially Mediterranean, where fifteen genera exist, and there are four in Jamaica; the *Squammipennæ* are tropical, and numerous in Jamaica; the *Scomberoids* are cosmopolitan, and numerous everywhere; the *Mullets* are tropical, and there are several in Jamaica; the *Labroids*, very rare here, are numerous in the tropics; the *Cyprinoids*, though quite cosmopolitan, have never been found in South America, and there are none in Jamaica; one *Centropomus* is found in fresh water in Jamaica, which is unusual; the *Siluroids* are few, those of America are few in comparison with those of Asia; while a kindred family, the *Goniodonts*, are peculiar to this country; the *Pleuronectidæ* belong to the temperate zone, yet there are few here.

J. M. Barnard, Esq., stated a fact in confirmation of the tropical character of the American marine fauna; he had lately received a keg of echinoderms from Zanzibar, in 5° S. latitude, which were almost identical with those from East Florida.

Prof. Parsons stated some facts in regard to the animals of the White Mountains, which he had learned from an experienced hunter, especially in respect to the abundance of the sable and deer.

Prof. Agassiz remarked that the fauna of the Adirondac Mountains, 1500 feet above the sea, is essentially that of the fur countries.

The Treasurer announced that the entomological collection of the late Dr. Harris had been delivered to the Society, and that the money had been paid to Mrs. Harris. The Society for the Promotion of Agriculture, which had subscribed liberally, were very anxious that Dr. Harris's Report to the Legislature, now out of print, should be reprinted. On motion of Prof. Parsons, a committee of five was appointed to inquire into the best means of republishing the work, if possible with illustrations; the committee consisted of Prof. Parsons, J. M. Barnard, Dr. A. A. Gould, and Messrs. Agassiz and Charles Hale.

Mr. Alexander Agassiz gave an account of the condition of the collection, which is for the most part in good order.

The committee to whom was referred the letter of Dr. I. I. Hayes, announcing his intention of making another attempt to reach the north pole of the earth, reported as follows:—

The Committee to whom was referred the letter of Dr. I. I. Hayes, announcing his intention of making another attempt to reach the north pole of the earth, would report:—

1. That we regard the proposed expedition with no ordinary interest; and receive assurance that it will be successfully prosecuted, in view of the near approaches which have already been made in that direction;—the reasons by which it is shown that the obstacles hitherto encountered may be in a great measure evaded;—the personal experiences of its conductor of the dangers and rigors to be met, and his ability to forestall them;—and especially in his acquaintance with the residences and character of the natives on whom he must mainly rely for extra aid—an acquaintance probably superior to that of any other person.

2. That while the hopes of former expeditions may not have been fully realized, yet that in view of the additions made to human knowledge as to the meteorology, geography, and other natural features of our globe, as well as the proofs they have given of

the physical endurance, perseverance, and moral energies of our race; enough has been attained to entitle them to be considered as any thing but unsuccessful; and that we anticipate similar results from this, results in no way inferior to those attaching to previous expeditions.

3. That whatever of encouragement and countenance can be derived from this Society, we wish to tender to Dr. Hayes; assuring him that our best wishes will accompany him—and of our confidence that his return will be fraught with fruits most valuable to science.

All which is respectfully submitted.

AUGUSTUS A. GOULD,
SAMUEL KNEELAND, Jr. } Committee.
THEOPHILUS PARSONS.

The Report and accompanying Resolutions were accepted and adopted as the sense of the Society, and the Corresponding Secretary was directed to communicate a copy of the same to Dr. Hayes.

Messrs. William B. Gibson, and Albert Ordway, of Boston, were elected Resident Members.

November 17, 1858.

Dr. C. T. Jackson, Vice-President, in the Chair.

Prof. Parsons, from the committee appointed at the last meeting to inquire into the best method of securing the reprinting of Dr. Harris's work on insects, made a report recommending immediate action in preparing a memorial to the Legislature, concurrently, if necessary, with other Societies. On his motion it was voted that a committee be appointed with full powers to take the steps necessary to procure a new edition. The subject was referred to the same committee by the Chair.

Dr. Kneeland read a paper on the North American fur-bearing animals of the genus *Mustela*, exhibiting in illustration a skeleton and skins obtained by him at Lake Superior in the winter of 1856–7, and presenting and describing a skeleton of the fisher, *Mustela Canadensis*, Schreber.

These animals, called martens, to distinguish them from the mink and weasels (of the genus *Putorius*), are two, the fisher or Pennant's marten, and the pine marten, or American sable—the mink is often erroneously called American sable by hunters and furriers. The length of the skeleton to end of tail was 33 inches, tail 13 inches, skull 4 inches, lower jaw 2½ inches—the dorsals are 14, lumbar 6, sacral 3, and caudal vertebræ 20; ribs 14 pairs, of which 10 appear to be true. The pine marten (*Mustela Americana*, Turton) is much more rare, and more valuable for its fur.

A specimen of the rare plant, *Sullivantia Ohionis*, Torr. & Gray, was presented in the name of Mr. I. A. Lapham, of Milwaukee, found by him on wet sandstone cliffs at the dells of the Wisconsin river, where the La Crosse and Milwaukee railroad crosses. As far as he knew, this species had only been found previously on calcareous cliffs in Ohio by its discoverer, Mr. William S. Sullivant.

Mr. Theodore Lyman exhibited specimens and enlarged drawings of the animal of *Syndepas Gouldii*, showing that this coral is different from the *Caryophyllia solitaria*, Lesueur.

Dr. Borland exhibited two specimens of aggregated crystals of ferruginous quartz, from Valentia, Spain.

Prof. Agassiz remarked that of the European species of Salmo, the *S. salar*, Linn., is found on both sides of the Atlantic; while the *S. eryox*, Linn., called *S. hamatus* by Cuvier, remarkable for the hook in the lower jaw of the male, and differing from the other in color and shape, has been hitherto considered as confined to Europe. But on the 29th of October a fish of the latter species was caught in the Merrimac River, and examined by him—another example of Arctic species coming down on the American as well as the European coast.

In the family of Salmonidæ, Cuvier unites the abdominal fishes with an adipose fin, and a peculiar structure of the upper jaw—the maxillary and intermaxillary forming a continuous arch. J. Müller has more recently pointed out structural differences in this family. In those Salmonidæ having no pseudobranchia, he found some with complicated anterior vertebræ, and such he called Characini—others, with the maxillary and intermaxillary bones united side to side into an immovable arch, he called Scopelini. The true salmons belong entirely to Arctic and cold regions—the Characini are tropical and fresh-water species of America and Africa, being absent from Asia and Australia—the Scopelini are marine, and of the temperate and warm regions. The dentition of Characini is peculiar, varying much in different members of the family; in a new genus Analcestis, Ag., from Rio Remak, Peru, resembling Chalceus, Cuv., there are no canines behind the multicuspidate grinders. He had ascertained by direct comparison that the species of different basins are different, though belonging to the same genus; many species considered identical by Valenciennes will no doubt prove to be distinct. The Characini are now known to extend beyond South America into Texas and Cuba, and they are probably numerous in Central America.

In the course of a discussion on the so-called migrations of fishes, Prof. Agassiz referred to the well-known return of the salmon to the rivers where they were born—and said that what has been called migration, as in the case of the shad, is only the successive arrival of different individuals, (as the whole number is going northward to spawn,) in different latitudes and in different months, later according to the increase of latitude. Upon this subject very little is known; but it is certain that fish do not always approach the shore to get into warmer water; they may perhaps do so to be relieved from the pressure of great depths.

Dr. Brewer observed that the European Widgeon, occasionally seen in this country, had been found on Long Island, apparently breeding—also that the European Saxicola is found breeding in Labrador; this had been called *S. œnanthoides* by Mr. Cassin, who considered it a different bird from *S. œnanthe*, Linn.

Two small bones exhibited to the Society were pronounced by Prof. Agassiz to belong to the anterior portion of the anal fin of some *Chætodon*, probably of the genus *Platax*.

Dr. Green tendered the resignation of his office of Curator of Comparative Anatomy, which was accepted, and Messrs. Whittemore, Lyman, and Kneeland were appointed a committee to nominate a candidate to succeed him.

Messrs. Francis H. Brown, and Jacob Burckhardt, of Cambridge, were chosen Resident Members.

December 1, 1858.

Dr. C. T. Jackson, Vice-President, in the Chair.

Dr. C. F. Winslow read a paper on "Comets and the curvature of their tails," in which he discarded the material theories heretofore entertained respecting the constitution of the tails of these bodies, and set forth a theory of luminous waves generated by the nucleus, which are arrested, decomposed, and swept back into space by the rays of light projected from the sun.

Prof. Parsons read a memorial to be presented at the next session of the Legislature by the Boston Society of Natural History, the Massachusetts Historical Society, the Massachusetts Society for promoting Agriculture, and the American Academy of Arts and Sciences, requesting the republication of Dr. T. W. Harris's work on the "Insects injurious to Vegetation," with illustrations.

The memorial was adopted, and, on motion of Prof. Parsons, committees were appointed to confer with those Societies: Prof. Parsons and Dr. Gould to confer with the Academy, and Messrs. Barnard and Binney with the other Societies.

Mr. T. T. Bouvé announced the donation of a valuable collection of the bones of *Zeuglodon cetoides* from C. S. Hale, Esq., of Burlington, New Jersey, and read the correspondence between the donor and himself on the subject. With regard to this species he made the following statement:—

In 1832, Dr. Harlan, of Philadelphia, first described a vertebra of a supposed gigantic fossil saurian, for which he established the genus Basilosaurus. In 1835, Prof. Agassiz described a tooth of this animal, at the University of Cambridge, England, as belonging to a genus allied to the seal family, which he named Phocodon. In 1840, M. Grateloup, from the examination of a fragment of the jaw containing teeth, at first uncertain whether to refer it to a cetacean or a saurian, finally placed it among amphibia, in a genus which he called Squalodon. In 1839, Prof. Owen, satisfied that the animal was a cetacean, proposed for it the name of Zeuglodon cetoides. In 1843, a great part of a skeleton, found in Alabama, was described in the American Journal of Science. Soon after this the Hydrarchos Sillimani of Dr. Koch was exhibited, in a series of bones measuring 114 feet; this Prof. J. Wyman discovered to be made up of several individuals, and the so-called head to be composed of bones some of which were not in their natural position. In 1845, Dr. R. W. Gibbes described, in the Proceedings of the Academy of Natural Sciences, some teeth which he referred to a new genus Dorudon, from the shape of the teeth; he subsequently gave up this genus and referred his specimen to the Zeuglodon, making, however, a new species, Z. serratus; he also ascertained the identity of the genus Squalodon with Zeuglodon. He thinks that the original genus Basilosaurus should be restored, with the following species: *B. cetoides*, Owen; *B. serratus*, Gibbes; *B. squalodon*, Grateloup.

This collection consists of 36 vertebræ, and 26 fragments of ribs and other bones. Zeuglodon remains are found in abundance in the eocene deposits of Alabama; they have also been found in Georgia and Louisiana.

On motion of Dr. Gould, a committee was appointed to express to Mr. Hale the feelings of the Society for this valuable donation, which included also at some future time his entire cabinet of Natural History—Mr. Bouvé, Dr. Gould, and Prof. Agassiz were appointed the committee.

Dr. A. A. Gould presented the following descriptions of Shells collected in the North Pacific Exploring Expedition under Captains Ringgold and Rodgers :—

Succinea lauta. Testa magna, tenuis, plerumque S. obliquæ similis, sed posticè tumidior, ad apicem minus acuta. Long. $\frac{8}{10}$; lat. $\frac{5}{10}$ poll. On shrubbery at Hakodadi (Isl. Jesso).

A very large, thin shell, most like *S. obliqua*, Say.

Vitrina imperator. T. magnifica, fragilis, ventricosa, epidermide rigida fuscescente induta, obsoletè spiraliter striata; anfr. 3+. Apertura ampla subcircularis, ad columellam vix incrassata. Axis $\frac{3}{4}$; diam. $1\frac{1}{2}$ poll.

Inhabits Hong Kong in ravines near summits of hills.

By far the largest species yet described; approximates closely to *H. ampulla*, Bens.

Helix læta. Testa tenuis, lucida, subglobosa, viridi-cornea, vittâ rufâ ad peripheriam et alterâ propè suturam ornata; anfr. 5 ventricosis, striis volventibus tenuissimis. Apertura magna, subcircularis, peristomate modico, everso, ad umbilicum magis reflexo. Axis 1; diam. $1\frac{1}{4}$ poll.

Inhabits Hakodadi on bushes and shrubs.

General outline not unlike *H. pomatia*.

Helix labilis. T. parva, tenuis, nitida, succinea, depressa, lenticularis; ad peripheriam acuta; subtus convexa, polita, arctè umbilicata; anfr. 5 convexiusculis. Apertura transversa, angustè lunaris, columella verticalis. Axis $\frac{1}{10}$; diam. $\frac{1}{8}$ poll.

Inhabits Hakodadi, among dead leaves, in woods.

Very nearly allied to *H. misella.*

HELIX PUPULA. T. minuta, ovato-conica, levis, succinea, infra convexa, indentata; anfr. 6+ tabulatis, ad peripheriam obtusè angulatis. Apertura transversa, lunata; labro simplici, columellâ rectâ, reflexâ. Axis ad $\frac{1}{5}$ poll.

Among dead leaves in woods, Hakodadi (Isl. Jesso).

Very much like our *chersina*, or the European *fulva.*

HELIX PAUPER. T. parva, discoidea, rufo-cornea, striis incrementi costulata, subtus calyculata; anfr. $4\frac{1}{2}$ convexiusculis; suturâ profundâ. Apertura perobliqua, prona, rotundata; peristomate simplici. Diam. $\frac{3}{10}$; axis $\frac{1}{8}$ poll. On dead wood in thickets, Petropaulski, Kamtschatka, also Hakodadi (Isl. Jesso).

Allied to *H. rotundata* and *perspectiva.* Probably the same noted by Middendorff as *H. ruderata* of Europe.

HELIX OPERCULINA. Testa tenuis, depressissima, rufo-cornea; anfr. 5 concavo-convexis, ad peripheriam acutissimè carinatis, marginatis; subtus concava deinde convexa. Apertura angustissima, sigmoidea, peristomate vix reflexo. Axis $\frac{1}{10}$; diam. $\frac{3}{10}$ poll.

Inhabits Peel Isl. (Bonin Is.) Mr. Wright.

An exceedingly depressed species, looking much like the opercle of some Trochus.

HELIX SQUARROSA. Testa planorboidea, squarrosa, ochraceo-cornea, subtus pallidior, convexa, latè umbilicata; anfr. 6 convexiusculis, ad peripheriam subangulatis. Apertura parva, angusta, lunata; peristomate simplici, ad columellam reflexo.

Diam. $\frac{6}{10}$; axis $\frac{3}{10}$ poll. (probably immature.)

Ousima (Japan), among stones on hill sides.

Well distinguished by its large deep umbilicus, ochreous color, and rough, scaly surface. Allied to *Shanghaiensis.*

NANINA PISOLINA. Testa fragilis, vitrea, levis, mellita, orbicularis, subtus convexior, imperforata; anfr. $3\frac{1}{2}$ depressis, ad peripheriam rotundatis. Apertura lunata, labro ubique simplici.

Diam. $\frac{1}{4}$; axis $\frac{1}{6}$ poll. Cape of Good Hope (?)

A small globular species unlike any one I have found described.

Sub-gen. CORILLA, H. & A. Adams (emendatus). Testa planorboidea, plerumque sinistrorsa, plus minusve distorta, arctè spirata, subtus concava; fauce in fundo denticulis compressis ferè occluso, quorum uno sæpe ad aperturam producto; peristomate incrassato, reflexo.

C. PULVINARIS. T. utrinque concava, cornea, striis incrementi conspicuis insculpta; anfr. ad 7 (subtus 5) ultimo demum deflecto. Apertura lunata admodum campanulata, peristomate flexuoso, satis reflexo; denticulis in fauce ad 9, haud productis.

Diam. $\frac{3}{4}$; axis $\frac{1}{5}$ poll.

Hong Kong, high up in the ravines; also near Canton.

Almost precisely of the size and shape of *H. refuga*, Gould, but that is reversed and has a lamina running to the aperture.

STREPTAXIS SINENSIS. Testa obliqua, polita, virescens, spira depressa, ovoidea, anfr. 7 acutis, sutura profunda minutè crenulata. Apertura obliqua, semi-ovalis, verticalis, lamellâ unicâ palatali munita; peristomate flexuoso, reflexo; columella recta; umbilico amplo. Axis $\frac{3}{10}$; diam. $\frac{1}{4}$ poll. Inhabits Hong Kong.

Differs from *S. Souleyetana* in its smaller size, smooth surface, flexuous lip, and more elongated aperture.

CLAUSILIA PRÆCLARA. Testa sinistrorsa, clavato-fusiformis ad apicem producta, dilutè carnea, liris conspicuis clathrata; anfr. 11 ultimo angustato, trientem long. testæ adequante. Apertura pyriformis, anticè sub-canaliculata; peritremate albo satis reflexo ad anfr. ultimum haud coadnato; laminâ palatali elevatâ, tenui, l. columellari conspicuâ, duplici, contortâ, lamellis 4 tenuibus ad interspatium, extus apparentibus. Axis 1; diam. max. $\frac{1}{4}$ poll.

Inhabits Loochoo.

Allied to *valida, insignis*, &c., but most like *pluviatilis* on account of its aperture.

ALYCÆUS PILULA. Testa parva, ovato-conica, imperforata, rufescens, striis numerosis (sub lente) cincta; anfr. 4 rotundatis, ultimo constricto; suturâ profundâ. Apertura circularis, anfrac-

tum proximum vix attigens; fauce valdè contracto; peristomate modicè reflexo; fistulâ suturali exili valdè appressâ. Operculum corneum, arctè spirale, apice centrali. Axis $\frac{1}{4}$; diam. $\frac{1}{5}$ poll.

Inhabits Hong Kong, China.

Cyclotus illotus. T. planorboidea, rudis, rubiginosa, subtus latè et profundè umbilicata; anfr. 4 rotundatis, suturâ simplici, impressâ. Apertura circularis, anfractum proximum haud amplectens; labro simplici. Diam. 3; axis 1 poll.

Inhabits Loochoo.

In form and general aspect greatly resembling *Cycl. suturalis*, Sowb., but is smaller, and has a simple suture.

Cyclostoma barbata. T. parva, ovato-conica, rufo-cornea, liris numerosis volventibus et striis incrementi tenuibus lamellosis decussata, decussationibus barbam gerentibus; anfr. 5 rotundatis, suturâ canaliculatâ. Apertura posticè subangulata; peristomate simplici, vix expanso; umbilico modico, profundo.

Diameters $\frac{1}{8}$ inch. Inhabits Ousima.

Two of the ridges on the outer whorl and one on the others are more conspicuous than the rest.

Cyclostoma citharella. T. parva, subglobosa, tenuis, rufa, laminis incrementi tenuibus ornata, ad peripheriam propè aperturam biangulata, satis umbilicata. Apertura circularis, peristomate simplici anfractum proximum tantum attigente. Operculum subrotundum, paucespiratum, margine attenuato.

Diameters $\frac{1}{8}$ inch. Inhabits Ousima.

Were it not for the operculum, it might be mistaken for *Helix harpa*, Say.

Cyclostoma musiva. T. ovato-conica, cornea, radiatim rufo strigata, subtus ad peripheriam rufo tessellata, modicè umbilicata, striis volventibus ad 5 arata, lineis incrementi conspicuis decussata; anfr. 5 rotundatis, suturâ canaliculatâ. Apertura rotundata, peristomate simplici. Axis $\frac{1}{4}$; diam. $\frac{1}{5}$ inch.

Inhabits —? (probably Japan).

The surface is conspicuously and beautifully relieved by the decussating lines.

The preceding three species form a peculiar group near to Cyclostoma proper, characterized by the thin paucispiral opercle with thinned edges, the globose conic form, free umbilicus, nearly circular peristome which barely touches the preceding whorl, and the projecting lamellar striæ of growth decussating with revolving ridges in some cases furnished with epidermal barbs. It may be called JAPONIA.

HELICINA VERECUNDA. T. pyramidato-lenticularis, spiraliter minutissimè striata, luteo-virens ad apicem rubescens, ad peripheriam subangulata, subtus convexa, admodum callosa; anfr. 4 planulatis. Apertura ovato-triangularis; peristomate evaso, albido, ad columellam rectam angulariter juncto.

Axis $\frac{1}{5}$; diam. $\frac{1}{4}$ inch. Inhabits Loo Choo.

Belongs to the group of which *H. striatula* is a type.

Mr. A. E. Agassiz made the following communication on the mechanism of the flight of *lepidoptera*:—

The nervures of the wings of butterflies are so arranged as to give the greatest lightness and strength; they are hollow, with their greatest diameter at the base of the wing, the point of greatest strain, their diameter gradually diminishing to the edge of the membrane. If a section be made across such a wing, parallel to the axis of the body, we find very much the arrangement which has been experimentally proved by Fairbairn and Stephenson as giving the greatest strength of beams, as exemplified in the tubular bridge—in the insect nervure, as in the strongest beam, we find the most possible material thrown into the flanges, and the upright support as thin as practicable—in the insect wing we have a very thin membrane connecting two flanges, whose section is very great compared to the membrane, with the additional advantage that these flanges are hollow, increasing their strength and diminishing their weight. In all we find the strongest nervure placed either directly on or near the anterior edge of the upper wing; there is no such nervure in the lower wing, all being of nearly the same size, as such a one would have prevented the elasticity of the wing from assisting the flight to any considerable extent. The lower wing is always partially covered by the upper; were this not the case, in the downward beat the resistance of the air would cause the lower wing to become separated from the upper, and a current of air would rush through between the wings, and compel the butterfly to employ additional force to keep them together; as thus arranged, the resistance of the air keeps the wings together during the downward beat, and their elasticity during the upward. The curve in which any point of the wing moves during one beat is an arc of a helix, and not an arc of an ellipse as Strauss-Durckheim supposes.

The Corresponding Secretary read a letter from Dr. I. I. Hayes, acknowledging the receipt of notice of the Society's action with reference to his proposed Arctic expedition, and requesting permission to publish the Report of the committee. It was voted that he be permitted to make such use of the Report as he may think for his advantage.

The Corresponding Secretary also read the following letters which he had recently received, viz:—

From the Smithsonian Institution, February 20 and May 19, 1858, acknowledging the receipt of publications of this Society; from the Real Academia de Ciencias de Madrid, August 1, 1857, presenting its Memoirs, 3d Series, tomo 2^a, parte 2^a; William Sharswood, Philadelphia, Nov. 11, concerning the proposed publication of the descriptions of certain insects, &c.; M. Auguste Le Jolis, Cherbourg, France, Nov. 15, 1858, in acknowledgment of his election as Corresponding Member; Stephen P. Leeds, Rutherfordton, N. C., Oct. 28, and William G. Binney, Burlington, N. J., Nov. 17, also acknowledging their election.

The committee to whom was referred the nomination of a candidate for Curator of Comparative Anatomy, reported the name of Dr. James C. White, of Boston—and he was chosen.

A vote of thanks was passed to Mr. Daniel F. Hicks, of Wabashaw, Minn., for the donation of a sharp-tailed grouse, *Tetrao phasianellus*, Linn.

Hon. Richard Hill, of Kingston, Jamaica, was chosen a Corresponding Member; and Mr. Nathan Farrand, of Boston, a Resident Member.

December 15, 1858.

Dr. D. H. Storer, Vice-President, in the Chair.

Dr. James C. White exhibited specimens and figures of *Stephanurus dentatus*, Diesing, *Sclerostomum dentatum ?* Rudolphi.

These worms were found in the leaf-lard of an apparently healthy hog, in the adipose tissue near the kidney. They occupied a portion of the same about the size of a man's fist, and had burrowed through the mass in every direction, forming canals three or four millimetres ($\frac{1}{8}$ to $\frac{1}{6}$ of an inch) in diameter, which terminated in cysts. On cutting open these cavities, which did not communicate with each other, they were found filled with pus, and in each were two worms, male and female. The female is nearly double the male in size, and bent upon herself so that the two extremities meet. The head and tail of both sexes are red, and the bodies are a pale yellow, mottled with black. The females, being filled with eggs, were darker. They are oviparous, and the eggs were found in all stages of segmentation. They belong undoubtedly to the *nematoidea*, and, so far as can be ascertained from the scanty descriptions given, to the above-named species. Whether the embryo inhabits another part or not is not ascertained, for the mature worm only is known, and mentioned as found in the liver of the hog. They were situated along the course of a large blood-vessel, and no doubt gained their situation by boring through the circulatory system while in the embryonic condition.

Dr. Kneeland read the following communication on the breathing apparatus of the *Menobranchus*, showing the relative value of the branchial, pulmonary, and cutaneous respirations :—

In June last he put two of these reptiles into an aquarium with half a dozen minnows, varying in size from two to three inches. The fish were frequently seen nibbling at the expanded gills of the reptiles, which as often suddenly started from their ordinary state of repose, attempting to seize the fish, which they never succeeded in doing. In about ten days the menobranchs had nothing left of the gills but the almost bare cartilaginous supports, with only here and there a branchial fringe. The fish were then taken out, and the branchial fringes began to grow again, and in the course of six months had regained about half their normal size. He had watched these reptiles for two summers, and no similar falling of the gills ever took place, so that it appears in the present instance that the fish actually eat them off, their loss being a pathological and not a natural phenomenon—in either case this fact seems interesting in a physiological point of view, as bearing upon the respiratory organs of these reptiles. He had ascertained (see page 153 of this volume) experimentally that they survive out of water about four hours, showing that their pulmonary sacs, or lungs, are not alone sufficient for the maintenance of respiration. In the present instance, though their pulmonary sacs were the principal respiratory organs, the animals did not apparently suffer. These lungs are two, one on each side, cylindrical, with thin transparent walls like the air-bladder of fishes, with vessels ramifying through their thickness; they open anteriorly by a common trachea into the œsophagus, and are about two inches long and one sixth of an inch in diameter. According to Dr. Gibbes, the branchiæ are supplied with blood by the branchial artery coming directly from the ventricle, while no branch of this artery runs to the lungs, which are supplied from the aorta. These animals, even when their branchiæ are in full play, occasionally come to the surface and swallow air, which they emit in the water with a faint squeak, by means of the voluntary muscles with which the lungs are supplied.

The question arises, why are these lungs apparently sufficient for respiration in the water, and not in the air, though the respired element be in both cases the same? As there is no evidence of internal gills, the reason must be, that in the air, while the branchial tufts, from dryness are unfit for circulating the blood, the complementary respiration of the skin, so important in reptiles, cannot be carried on—the pulmonary sacs alone are insufficient for the aeration of the blood, and the animal dies. In the water, however, though the branchiæ, as in this case, be useless, the cutaneous respiration is unimpeded, and with the pulmonary is sufficient for the purification of the blood. This fact shows the importance of the cutaneous respiration and the insufficiency of the pulmonary, and that these reptiles cannot be considered truly amphibious, though probably approaching as near to this condition as any animals.

Specimens of *Pomotis* and *Esox*, and of amphibians, were presented by Mr. H. D. Thoreau, from Concord, Mass. Mr. Putnam was of opinion that one of the *Pomotis* would prove a new species. There are with us two varieties of *Esox*, commonly known as the long or shovel-nosed pickerel, and the short or trout-nosed, to the last of which the specimens belonged. Mr. Putnam was inclined to think these were distinct species, unless the differences should prove to be sexual. Drs. D. H. and H. R. Storer considered them varieties of the same species; Messrs. Baird and Girard think them distinct.

Dr. Bryant made some remarks on the habits of two fly-catchers, *Muscicapa acadica* and *M. flaviventris;* the former is represented by writers on ornithology as exceedingly wild, and as inhabiting the most solitary places; he had found it, on the contrary, generally quite familiar, breeding near his house, at Cohasset, Mass., and becoming so tame as to fly up to his hand to receive a moth. He also mentioned that he had seen last June two males of the white-crowned sparrow, a rare bird here even in winter.

Mr. A. E. Agassiz exhibited colored drawings of the *Salmo eryox*, Linn., recently taken in the Merrimac River.

DONATIONS TO THE MUSEUM.

October 6, 1858. Bones of the head and scapular arch of *Doras*, from Buenos Ayres; and coleoptera from Lunenburg, Mass.; by T. J. Whittemore. Skull and skin of a new species of Antelope from South Africa; by Thomas Nelson. A piece of impure ambergris from St. Domingo; by Capt. E. H. Russell.

October 20. Several European reptiles, as follows: *Lacerta viridis*, *L. agilis*, *Zoötoca vivipara*, *Vipera berus*, *Tropidonotus natrix* (2 varieties, one young in shell), *Anguis fragilis*, *Bufo calamita*, *B. viridis*, *B. vulgaris*, *Rana esculenta*, *R. temporaria*, *Bombinator igneus*, *Triton cristatus*, *T. igneus*, *Pelobates fuscus*, *Salamandra maculosa*, and *Hyla arborea*; by Dr. D. F. Weinland. A pigeon-hawk, *H. columbarius*, L.; by Samuel Rodman. Three new genera of Fishes; by Prof. Agassiz.

November 3. Shells from Mohawk, N. Y.; by Mr. Lewis. A gold and a silver pheasant; by Dr. Charles G. Greene. A crawfish from the Mississippi River; by Dr. S. Kneeland, Jr. A large collection of Zeuglodon bones; by C. S. Hale.

November 17. Skeleton of the fisher marten, *Mustela Canadensis*, Schreb. from Lake Superior; by Dr. S. Kneeland, Jr. Specimen of *Sullivantia Ohionis*, Torr. & Gray, from the dells of the Wisconsin River; by I. A. Lapham. Specimens of *Melania*, and of calamine, from Mossy Creek, Tennessee; by Dr. C. T. Jackson.

December 1. Sharp-tailed grouse, *Tetrao phasianellus*, L. from Minnesota; by Daniel F. Hicks. A specimen of Brazilian cotton; by W. H. Dennett.

December 15. Specimens of young *Pomotis*, *Esox*, and frogs, from Concord, Mass.; by H. D. Thoreau. Skull of young grisly bear and of a large beaver, from California; by E. S. Holden. Skull of young black bear from Lake Superior; by Dr. S. Kneeland, Jr.

BOOKS RECEIVED DURING THE QUARTER ENDING DEC. 31, 1858.

Formation of Rotating Rings by Air and Liquids. By Prof. Wm. B. Rogers. 8vo. Pamph. *From the Author.*

Remarks on certain Species of North American Helicidæ, with descriptions of new species. By Thomas Bland, F. G. S. 8vo. Pamph. New York, 1858. *From the Author.*

Report of Exploration of the country between Lake Superior and Red River Settlement. 8vo. Pamph. Toronto, 1858. *From Capt. Latour.*

Review of Marcou's Geology of North America. By J. D. Dana. 8vo. Pamph. *From the Author.*

Phycologia Australica, or a History of Australian Seaweeds. By W. H. Harvey, F. L. S. Nos. 1, 2, 3. 8vo. London. *From the Author.*

Hints to Craniographers. By J. A. Meigs, M. D. 8vo. Pamph. Phil. 1858. *From the Author.*

Catalogue of Birds in the Museum of the East India Company. Vol. 2. 8vo. London, 1856–58.

Catalogue of Lepidopterous Insects in the Museum of the East India Company. Vol. 1. 8vo. London, 1857. *From the Directors of the East India Company.*

Nereis Boreali Americana. By Wm. H. Harvey, M. D., &c. Part 3d. 4to. Washington, 1858.

Annual Report of Regents of the Smithsonian Institution. 8vo. Washington, 1858. *From Smithsonian Institution.*

Proceedings of the Academy of Natural Sciences of Philadelphia. Vol. X. Sigs. 10, 11, 12. 1858.

Memorias de la Real Academia de Ciencias de Madrid. Tomo 4. 3º serie—Ciencias Naturales. Tomo 2º. Parte 2. 1 vol. 8vo. Madrid, 1857.

Canadian Naturalist and Geologist. Vol. 3. No. 5. October, 1858. 8vo. Pamph. Montreal.

New York Journal of Medicine. Vol. 5. No. 3. November, 1858.

Receueil des Actes de l'Académie Imperiale des Sciences, &c., de Bordeaux. 19ieme année, 1857, 3e et 4e Trimestre, et 20ieme année, 1858, 1er Trimestre. 8vo. Bordeaux, 1858.

Jahrbuch der K. K. Geologischen Reichsanstalt. 1857. VIII Jahrgang. Nro 4. October, November, December. 8vo. Wien, 1858.

Silliman's Journal of Science and Arts. Vol. XXVI. No. 78, for November, 1858.

Journal of the Royal Dublin Society. Vol. 1. 8vo. 1858.

Proceedings of the Royal Geographical Society of London. Vol. II. Nos. 3, 4, 5. 8vo. London, 1858.

Berichte der Oberhessischen Gesellschaft fur Natur-und Heilkunde. 3 Nos. May 1854, October 1855, June 1857. 8vo.

Mémoires de la Société Royale des Sciences de Liége. Tomes XI. and XIII. 8vo. Liége, 1858.

Annales de la Société Linnéenne de Lyon. Tomes III. IV. 8vo. Lyon, 1856–7.

Natural History Review. Vol. V. No. 3. July, 1858. 8vo. London.

Memorie della Reale Accademia delle Scienze. Vols. I. II. 4to. Napoli, 1857.

Continuazione del Rendiconto della Reale Accademia delle Scienze. Anno V. et VI. Napoli.

Würtembergische Naturwissenschaftliche Jahreshefte. Vierzehnter Jahrgang. Zweites und drittes Heft. 8vo. Stuttgart, 1858.

Neue Formen von Infusorien. Von L. K. Schmarda. 4to. Pamph. Wien, 1849.

Nachrichten von der Georg-Augusts-Universitat und der K. Gesellschaft der Wissenschaften zu Göttingen. 1857. 12mo.

Annales des Sciences Physiques, &c., de Lyon. 2ieme Serie, Tome VIII. 3ieme Serie, Tome 1. 8vo. Lyon.

Canadian Journal of Industry, Science, and Art. No. 18. November, 1858. 8vo. Toronto.

Proceedings of the American Antiquarian Society. 8vo. Pamph. Boston, 1858. *Received in Exchange.*

Annals and Magazine of Natural History. Vol. II. No. 9, for September; No. 10, for October; No. 11, for November; No. 12, for December. 3d Series. London, 1858.

Fossils of South Carolina. By Profs. M. Tuomey and F. S. Holmes. 4to. Charleston, S. C. 1856.

Quarterly Journal of the Geological Society. Vol. XIV. No. 56, part 4. November, 1858. 8vo. London.

Mammals of Australia. By J. Gould, F. R. S. Parts 3, 4. Folio. London.

Monograph of Trochilidæ, or Humming Birds. By J. Gould, F. R. S. Parts 4, 5, 6. Folio. London.

Birds of Asia. By J. Gould, F. R. S. Parts 3, 4. Folio. London, 1851–3. *From the Courtis Fund.*

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ERRATA.

Page 11 last line but one, for *Damascenus* read *Damascena*.
" 25 line 12, for *Scolen* read *Scolex*.
" 152 " 14, " *Siredon* read *menobranchus*.
" 154 " 15, " " " "
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" 385 last line but one, for 20th volume read 10th volume.

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